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JOURNAL *of* EDUCATIONAL RESEARCH

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RESEARCH THAT PREVENTS RESEARCH

ORVILLE G. BRIM
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MAN is coming to see a new earth and a new heaven. He sees this is not, in fact, a fickle world. He realizes that it is in the main a world of law, that it is at least sufficiently stable to warrant the formulation of certain general principles and relationships in terms of which certain consequences may be foreseen, evil effects avoided, and desired ends secured. Man is coming to believe that by the use of his own intelligence he can understand these general principles or laws. He realizes that nature is neither fixed nor hostile, but has been changing gradually into a place more hospitable to man's interests and purposes. While the changes of the past have been more or less due to chance, much has been due to man's deliberate effort. Man is coming to believe, therefore, that by the use of this same intelligence he cannot only understand but master the forces of the universe, control them to his own ends, and make this more nearly an earthly heaven.

Moreover, he feels now that he and not some spirit resident in things, is the determiner of values that should be sought. The thought in the statement, "The Sabbath is made for man, and not man for the Sabbath," applies to all other things as well. Customs and conventions, institutions and organizations both industrial, social, political and religious, standards of morality and religious concepts are subject to revision in the light of fuller knowledge of man's interests. His values are paramount. All else is subordinate.

This point of view, this outlook on life, has been, in the main, the contribution of the scientific movement with its significant attitude, spirit, and method. As a result man has made tremendous progress in understanding and controlling his universe. By developing this scientific attitude, spirit, and method in all people and toward all man's problems, future achievement will be greatly facilitated.

Here then, is a major problem for education. Education must foster not mere habituation and indoctrination into practices and beliefs approved by the existing social order, but a courageous investigation not only of the laws and forces of the physical world, but of the nature and best interests of man himself in order that the latter may be more truly known and the former better utilized to further enrich the life of man. This implies that research is a key to progress and increased human happiness. It is the means by which man may better know his own values, the conditions under which and the means by which they must be attained. Since this is true, it would seem that the cultivation of the scientific spirit and attitude and the techniques of research ought to be a central objective in education.

This seems to be the accepted aim upon the graduate level. Minor researches, master's and doctor's theses indicate our intentions. A survey of our teaching practice and course organizations show that these intentions are not generally supported by our action even on this level. Furthermore, our bravest attempts to make cultivation of the scientific attitude and spirit the central objective of education on the graduate level, fall short because of the hopelessness of building on sixteen years of the usual school training with emphasis upon habit formations, inculcation of approved attitudes and beliefs, and memorization of what the book says or the teacher believes.

This state of affairs on the sub-graduate level is due to our partial conception of our problem. We have put off the fostering of the research attitude and ability until late in school life, assuming it to be the prerogative of the mature mind. When is research research? Is it research only when a person is working upon a question to which no one knows the answer? Or is it research when a student is working upon a question to which his professor does not know the answer? May it not be research when a student is working upon a question to which the student himself does not know the answer? If we center attention upon the attitude, the method, the thoroughness and honesty of the work and the relation of the question to the learner, rather than upon the relation of the question to present human knowledge, may we not conclude that research can be carried on upon any level?

The child is by nature an investigator, a research student seeking fuller and more accurate knowledge, an experimenter. True, his juvenile methods have not the accuracy of the scientific technique of maturity. But we fail in understanding when we ignore the spirit because of a

difference in details. Children are born with this much desired trait; their pre-school days are full of evidence of it; our present schools smother and destroy it. If we would further the realization of this scientific spirit and method, the research attack and attitude, if we would increase the amount and quality of knowledge that does contribute to the sum total of human happiness, school work from the beginning should be organized to promote critical creative thinking. It should be planned from the first grade to educate the child as an investigator, a discoverer of truth, a research student, and not primarily as a learner of answers. It is not assumed that all children have potential ability to contribute constructively to human progress. But we must conserve and develop whatever of this power does exist in all of them. Even in those whose gift in this direction is limited we may develop a sympathy and understanding of inestimable value. Moreover, it seems apparent that the atmosphere and methods most conducive to the development of the scientific attitude and research ability, if properly adjusted to the varying ages and abilities are indeed the optimal conditions for all learning.

In view of this, one would rather think that the creation of a school that fosters the scientific attitude in teachers and children and that provides opportunity for them to practice the scientific method would have been one of the first objectives and results of the scientific movement in education. Quite the contrary has, in the main, been true, for the movement has been primarily concerned with perfecting the details of existing practices. When a complete reorganization is called for, as in the case of Bobbitt,[1] it makes the situation worse than before. By standardizing the status quo and using its norms as means of educational accomplishment, by confining his efforts to the minutia of measurement and the miscellany of specific details of achievement, the typical research worker in education has failed to recognize the high social challenge. Far more fundamental changes in the education process are implicit in the broader conception of the scientific method as the mode of the modern mind, a thing to be conserved, cultivated, and utilized to the full in the process of developing a thinking generation.

What type of education is implied in the scientific movement? What type of school, of curriculum, of teacher and supervisor? In general outline the answer here seems quite apparent. The interesting and

[1] I refer to Bobbitt's early plan for curriculum revision set forth in his *How to Make a Curriculum* rather than his later statement in the Twenty-Sixth Yearbook of the National Society for the Study of Education.

anomolous thing is that the type of school most consistent with the implications of the scientific movement has been advocated and realized by those who are lukewarm or even hostile to that movement in education which now claims to be waging warfare under the banner of science. That is, one finds in the progressive schools of this country and Europe a type of school organization, curriculum, classroom procedure, and teacher guidance more in keeping with the dictates of the scientific movement than in any school produced under the guidance of those who represent the current concept of scientific education.

The reason for this seems evident. Those who have been responsible for the progressive school movement have centered their attention upon the spirit and not the technique of science. They have sought to create a school that frees the intelligence of teacher and child, that stimulates the spirit of inquiry, that provides opportunity for investigation and experimentation. Leaders in the progressive movement have centered their attention mainly upon the element of creative thinking at each level of learning. True, they have made many mistakes. They have been enthusiasts, propagandists, and not particularly critical. But given the basic organization and spirit which this group is seeking to realize, the addition of the more exacting techniques is a relatively simple matter.

In order that those who worship at the shrine of science may hear the verdict of one who is a master in their own field, the reader is referred to a book by Armstrong.[2] The demand made by this man embued with the deeper significance of the scientific movement is as radical as that found in our most progressive schools. In the school he visions the children as would-be finders, not learners, of answers. Answers of others would be learned of course, but learned as data relative to the pupils' own problems and used as material with which to think more effectively. Thinking, not memory and drill, would be the basic method of learning. The school would be a laboratorium not an auditorium, an activity school, not a sitting-listening school. The time-schedule would, in large measure, disappear, or be greatly altered. On the elementary level, at least, where the child's interests and purposes have to do with things and where effective thinking depends upon contact with concrete materials, the school will be more typical of a shop than a library. The purpose would be to provide more first hand experience and less "reading about" the experiences of others.

[2] Armstrong, H. E. *The Teaching of the Scientific Method.* New York: The Macmillan Company.

The curriculum would have to be closely related to the interests and experiences of children, meaningful and vital to them, otherwise the aggressive, searching, ingenious and persistent type of thinking so desired would not be secured. It would consist of problems, questions to investigate, rather than subject matter set out to be learned. An integrated curriculum is essential. Real child problems, when investigated and followed up in their many leads and implications, do not stop at subject lines. Neither are these problems confined within the limits of the present curriculum. The school curriculum must become as large as life itself.

To foster research the curriculum must be flexible. Aggressive thinking, child research, to be most effective, must have a personal element. While the teacher must supervise so as to insure the selection of fruitful problems and growth in mastery of method and point of view, the pupil must be free; free to purpose, to plan, to judge, to make mistakes, to take his own time, to try again in his own way, to conclude, and to test his conclusions. How else will he grow in appreciation, in understanding and mastery of the difficult task of rigorous, critical thinking?

Just as this means flexibility in curriculum content and method, it means lack of fixed and uniform standards and outcomes. Children will not necessarily arrive at the same place in knowledge of subject matter and in mastery of skills, or if they do, they will not arrive there at the same time. It means not only flexibility in standards but a change in standards to the traits and attitudes that are an integral part of a free and disciplined intelligence.

In such a school the acquisition of power in the use of tools of learning would be subordinated to a realization of need and significance. Necessary these skills are, and of basic significance. Their mastery should be secured by the most economical and effective methods. The criteria, however, of "effective methods" need revision. In judging effectiveness it is not enough that we center attention upon the skill outcomes alone. We must observe the first principle of science, i.e., consider all the factors involved in the case, the total effects of the methods used. The present mechanical procedure for teaching the "tools of learning" secure skill in meeting routine situations at the expense of dynamic interests, favoring attitudes, intelligent realization and appreciation of the meaning and use of the skills in further investigations and original thinking. If one is concerned in developing the scientific attitude and mastery of its method he must provide situations in which children have opportunity

to adventure, to master these skills as meaningful tools in an ongoing process that gives constant opportunity for discriminative thinking.

This school, conceived by a scientist, calls for a new type of teacher. In such a school the teacher is primarily a director of pupil research. Guidance in choice of problem, in planning and conducting investigation, in criticising and evaluating methods and conclusions would be her major task. She would know the findings of science so far as they bear upon her work but she would be master of them rather than mastered by them. She herself would have to be a master of the methods of investigation and be able to adapt such methods to the age and ability of the child concerned. In this there would be little that is routine; for her teaching, itself, is a problem of constant research, i.e., how to utilize the resources of the school and the environment to foster constructive thinking on the part of each child. Buckingham touches upon this concept of teaching in the following paragraph, "Indeed," he says, "when looked at from this point of view the teacher's occupation becomes fascinating. He has children to study—not stones, bugs, fossils, or old manuscripts, but the most interesting of all possible materials—namely, human beings. Moreover, he has at hand human beings at their most engaging period—childhood and youth. And his children never grow old. In constant procession they present to him, always at the level of childhood, their innumerable interesting aspects. Yet each is different from the other—different in strength, talent, and character; different in origin, growth and need. If teaching these children is to include studying them, the job of teaching takes on new dignity. Its scope is broadened. Its meaning is enriched. No other calling may then be compared with it. It is the great adventure."[3]

It is not enough to have a teacher with the research attitude. She is at the mercy of the supervisor. To realize our purpose, therefore, we must have a supervisor who conceives his function as that of helping the teacher direct more effectively the investigations of children, to help the teacher herself to grow through investigation and research, through creative thinking about the problems before her. Because of the need for flexibility in both process and product, because of the need for each school being adapted to the group as a whole and to the individuals, because of the variation in problems pursued by pupils and the problems faced by

[3] Buckingham, B. R. *Research for Teachers* (Silver, Burdett and Co.), p. 1. The only objection to this book is that it conceives of teacher research as dealing with problems of the old school rather than with the problems related to fostering research ability in children.

the teacher, no pre-determined supervisory plan for all schools, or even for any one school, would be desirable. Procedure dictated by the supervisor or by science itself would be destructive of the highest values. Practice on all levels, supervisor, teacher, curriculum organization, and child activity should be conducted so as to foster the ability to further the discovery of truth.

Here we have what seems like a restatement of position held by the child-centered group of educators but it is not. It is merely a re-phrasing of the conception of education arrived at by Armstrong, a master in chemistry, as he interprets the full meaning of the scientific movement for education.

Why does this scientist's vision of education seem so strange? The mood of education in America to-day is predominantly scientific. Scientific supervision, scientific determination of objectives, of content, of method, of grade placement of subject matter, of sequence within grades, of time distribution between subjects, of pupil grouping, class size, pupil achievement, etc., meets one on every hand. And yet the more scientific education progresses, the more fixed becomes the program, and the less chance has the teacher to be scientific in a broader sense or to develop in the child the scientific attitude or method of work. It is leading to routine procedure on the teaching and learning levels, and, worse than that, it is fostering, if not compelling the production of routine living by children, the very antitheses of the scientific spirit.

Evidence for this abounds. Any one who is familiar with the influence of the scientific movement in education upon schools, must see how poorly it promotes, how frequently it prevents, the type of work essential to the cultivation of the scientific spirit in teacher and child. A few instances, however, can be given.

As a result of research in the relative difficulty in the number of combinations, Buckingham and Osborn[4] have produced a book that tends to fix specifically, and with the authority of science, the sequence in which number combinations should be presented to and learned by children. If experiences are provided to furnish a background for these combinations, they must be definitely controlled in order that the approved combinations will arise.[5]

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[4] Buckingham, B. R., and Osborn, W. J. *The Buckingham-Osborn Searchlight Arithmetics.* Boston: Ginn and Company.

[5] For a more promising sign in this connection, see Brownell, W. A. *The Development of Children's Number Ideas in the Primary Grades.* Chicago: University of Chicago. Supplementary Educational Monograph, No. 35.

What chance is there for child adventure into enticing experiences where quantitative thinking would be real and vital? Were he to do so, he might throw the "perfect" system out of order. What chance for the teacher to adventure in a new arrangement of experiences involving quantity, or to utilize some fruitful child lead? Past research in arithmetic has attempted to facilitate learning of a certain kind. As a result it has increased the rigidity of the program.

Methods for teaching many of the detailed processes in reading, writing, and spelling have been scientifically guaranteed to secure the best results. Of course, the research students disagree among themselves but the teacher does not know this. The conclusion she hears or reads comes with the weight of authority and she accepts. In this she has long been habituated. These findings are organized by specialists into a convenient pattern procedure which "makes definite for both principal and teacher the work that should be done each day." In place of a challenge that stimulates teacher thinking and research we provide them with a standardized procedure.

The same thought-paralyzing influence is found in the field of objectives. They are scientifically determined and authenticated. The minor objectives are further listed. An outlined program of teaching is arranged and effective experiences and exercises whereby each of these objectives in its turn may be directly sought and mastered are listed. All the teacher need do is push the proper button.[6]

The realization of a school where teacher and pupil research are a dominant type of activity is further obstructed by the use of standard tests. It is axiomatic that a teacher will try to achieve the goals by which her success is measured. Standardized tests, limited as they are mainly to the measurement of factual knowledge, and habits and skills in the fundamentals, have riveted the teacher's attention upon these matters. Under pressure she seeks the most direct route and resorts to drill. So again does science in education improve this aspect, but misses the larger goal.

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[6] In this connection see the Dayton or St. Louis courses of study; *How to Make a Curriculum* by Franklin Bobbitt; or *The Technics and Evaluation of a Supervisory Program in Work Reading*, Educational Research Bulletin, No. 12, Minneapolis Public Schools. For an illustration of the scientific technique applied to curriculum making with all its implications for pattern teaching see the report by S. A. Courtis on "Curriculum Construction at Detroit,"—The Twenty-Sixth Yearbook of the National Society for the Study of Education. Part 1, pp. 199-203. Note especially the plan for putting the course of study into practice.

The finality of the answers of science in education is well illustrated by Knight and Bobbitt. To Knight, thinking by the teacher is in ill-repute. That task is pre-empted by the supervisor, for Knight likens the teacher in her relation to the supervisor to that of an interne following the advice of a master surgeon. What a betrayal of the message of science to the human race! Bobbitt would allow both teachers and supervisors to think but only to find out what the answers of science are. These are "authoritative," "dictatorial," "mandatory." His article abounds in such and similar phrases. When once the answer of science has been found, questioning and thinking cease. All one can do is to obey. He expresses himself as follows: "It is this educational science which should *dictate everything* (italics mine) that is done by anyone. If the work is done *in strict obedience to educational science*, then it is rightly done. . . . . *The science is the authority.* There is no other. There is to be obedience. But it is the obedience to science."[1]

As was said before, one would naturally expect these leaders in the scientific movement in education to be the most ardent advocates of a type of teaching that exhibited the scientific attitude and method and a school that fostered this in children. It should be to them a "pearl of great price." Instead they have through their research and leadership tended to emphasize and make more rigid the formal aspects of the school. The teacher has become a follower of rules and the school a mechanism that moves according to the "dictates of science."

Why? The reasons are doubtless many. A few more apparent ones may be noted.

Educational science is new. Those who have been its spokesmen have been impressed with the greater reliability of the findings of research over the existing beliefs that these have at once been elevated to the position of "authority." This authoritative nature of any scientifically determined law seemed acceptable because the widespread reliability of a law in physics, chemistry, and mathematics was assumed to hold in the human realm. Thus they ignored the constant novelty of any situation involving humans. The findings of science are answers, better answers than those they replace, no doubt. But the conclusions of science are never final in the complex changing human problem. When so asserted they are obstacles to progress. Their maximum value is lost, unless they are looked upon merely as *data for further thinking and investigation.*

[1] Bobbitt, Franklin. *Scientific Principles Applied to Supervision.* Report of National Association of Penmanship Teachers and Supervisors, 1928, p. 12.

In the second place, educational scientists have applied the new technique where success was relatively assured. Specific methods in reading, and arithmetic, useful content in spelling, errors in language, vocabulary load for any grade, relative difficulty of number combinations, existing levels of achievement in habits and skills, are typical of the problems receiving major attention. For these, fairly ready and scientifically respectable answers could be found.

Meanwhile, a whole range of more difficult problems relative to the fostering of the spirit and skill of research await an answer. The conditions, previously stated in this paper as necessary to cultivate investigation by children are based upon observation and inference. What problems are vital to children? Which can they profitably investigate? How much self-direction, planning and self-criticism can we expect at the several levels? How much social heritage can a single personal investigation be made to carry? When do conclusions from others' experiences obstruct critical, creative thinking? What are a teacher's functions as a director of child investigators? How best perform these? How can a supervisor help? What kind of an examination will measure and foster rather than obstruct growth in creative thinking? What should be our grade standards in skills and knowledge if training in thinking is made the central purpose? To the solution of these and similar questions which are implicit in the scientific movement, education should dedicate their efforts.

But more than this it seems that many who so proudly bear the banner of scientific education have seemed to miss the basic meaning of it all. While they have rendered yeoman service to the cause, they have been concerned in settling the many questions that arise in our present educational program of habit formation, fact teaching and attitude indoctrination, than in fostering the scientific spirit in the coming generation, the true and permanent challenge of the scientific movement to educational leaders.

If the attitude which scientists seek to practice is basic, and so it seems to the writer, it should become a guiding principle for all educational practice rather than a technique to be used by a few who have escaped the deadening influence of the school upon the investigative spirit. It is short-sighted to apply it primarily, almost solely, to certain superficial questions where the technique can be applied with ease and some accuracy, and thus limit its influence and obstruct the major value

of the movement. By such partial thinking concerning the scientific method we not only show ourselves to be the product of the compartmented education which was our heritage, but actually prevent the scientific movement from making its fuller contribution to the oncoming generation. Vocally we subscribe to research but paradoxical as it may seem, we exalt certain traditional values and in the name of research destroy and disallow the potential research ability in children, and hamper the educational reconstruction which would ensue if we were, indeed, duly and broadly concerned with the whole problem in all its engaging and challenging implications.

DISTRIBUTION OF THE TEACHER'S TIME AMONG CHILDREN IN THE NURSERY SCHOOL AND KINDERGARTEN

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IT is a common saying that two small children in one family are no more work than one, because one child requires twenty-four hours a day of attention from the mother and it is impossible for two children to take more of her time. The same reasoning might be applied to the school situation. It is obvious, of course, that although the teacher is busy all the time, yet the amount of attention that each individual child receives will vary with the number of others with whom he must share that attention. We have at the present time no actual data upon which we can base an opinion as to the number of children which is most desirable in a nursery school or kindergarten group. From experience, we know that sometimes it is a practical advantage if a teacher is too busy to concern herself with some child who plays for attention. We also know that certain nursery school teachers feel that it is easier for two teachers to handle a group of 18 children than it is for one to control a group of 9, while, on the other hand, it is easier for three teachers to handle 27 than it is for four to handle 36. Just where the optimum size group comes, we do not know.

Many teachers report that two-year-old children take more time from the teacher than do three-year-olds, but just how many three-year-olds can be handled with the same out-put of energy and the same efficiency as one two-year-old is a bit of information which probably will not be acquired for some time.

The present study is an attempt to break the ground of such problems to the extent of discovering how much time children of the different sexes and different ages take in one school. It is impossible, of course, to measure the time that a teacher spends in thinking about any one child, or the time she spends, whether in or out of school, in planning the work of the days to come or reviewing events of the preceding day.

Observations were taken in the Nursery School of the University of Minnesota in the spring of 1929. At that time there were 33 children enrolled in the school, 16 boys and 17 girls. Of these, five were two years old; fourteen, three years; and fourteen, four years old. The school

employed three full-time teachers and a number of student assistant-teachers. At no time during the day were there fewer than four teachers on duty, many times there were five and during the luncheon hour there were twelve. Each of the full-time teachers in the school was observed for the equivalent of five full days. That is, Miss A was observed for five days between the hours of 9 and 10 and between the hours of 10 and 11 and so on until the records were complete for each hour of the day for five different days. The practice teachers were considered as a unit and no attempt was made to do anything more than to observe some practice teacher for the equivalent of five days.

On the record blank were noted the name of the child to whom the teacher paid attention; a brief statement of the activity of the child (conversed with someone, was quieted, helped with material, corrected, had clothing fastened, etc.); the place where the child was (the particular room, or playground); whether the child came to the teacher of his own accord or whether the teacher initiated the contact; and the number of seconds which the teacher spent on the child. In computing the data, we have taken into account absences from school and all our figures have been calculated as percentage of time when the child was present that the teacher gave him particular attention. Thus Edna B was present 344,820 seconds, and during that time took 2784 seconds of time when the teacher initiated the attention, and 381 seconds when the child came for help or attention herself. These figures are recorded as .81 percent and .11 percent and are thus comparable with the figures on John C. who was present 464,100 seconds.

A similar record was kept on two groups of kindergarten children in the spring of 1930. In all, the records give data on 33 children in the nursery school, 26 children in a morning kindergarten, and 14 in an afternoon kindergarten. In this report we shall consider first the nursery school records and later those on the kindergarten.

The types of care that were given nursery school children by the teachers have been divided into:

1. Physical care and habit training
   a. medical care, caring for scratches, taking to see nurse, etc.
   b. serving food at lunch
   c. attention at the luncheon table
   d. quieting in sleeping room
   e. helping in dressing
   f. helping in the toilet room

II. Play
  a. providing materials
  b. helping in large muscle activities
  c. preventing of bodily activity
  d. helping in small muscle activities
  e. directing a group at play
  f. removing from play, taking somewhere else by the hand, etc.

III. Social and emotional
  a. settling difficulties
  b. changing the emotional mood, comforting, encouraging, answering complaints
  c. giving a child a turn at some activity

IV. Conversation
  a. embodying a positive suggestion
  b. correcting or reproving
  c. social conversation

Of the types of attention listed above, it is impossible to treat Ib and c the same as the others can be treated, because a certain group of children is assigned to each teacher or assistant at luncheon and she never has anything to do with other children at that time. Table I summarizes the time taken by the two sexes and the three ages at the various activities.

TABLE I

PERCENTAGE OF TIME TAKEN BY NURSERY SCHOOL CHILDREN FOR VARIOUS REASONS

	Sex		Age		
Activity	Boys	Girls	2	3	4
Medical care	.03	.02	.03	.03	.02
Naps	.38	.18	.24	.21	.36
Dressing	.24	.18	.27	.25	.15
Toilet	.05	.04	.09	.07	.02
Providing materials	.02	.04	.03	.02	.04
Help, large muscles	.05	.05	.06	.05	.04
Help, small muscles	.01	.03	.01	.01	.04
Removal from group	.07	.02	.11	.04	.03
Settle difficulties	.01	.01	.01	.01	.01
Change emotional mood	.02	.03	.04	.03	.01
Gave child a turn	.02	.03	.02	.04	.02
Suggestion	.21	.18	.19	.24	.16
Correction	.07	.02	.01	.03	.07
Conversation	.24	.25	.19	.27	.25
Number of cases	16	17	5	14	14

From Table I it appears that a considerable portion of the teacher's time is spent talking with the children, either in the way of making suggestions as to activity or in social conversation. In this, no significant differences appear between the sexes or the different ages. The next most

time-consuming is the nap period. Here the boys clearly take more time from the teachers than do girls, and four-year-old children take more time than the younger children. The reason for this is obvious; more of the older children do not sleep at nap time, and, not being in the habit of a regular nap or rest period at home, become somewhat of a problem for the nursery school.

Another activity which calls for considerable attention from the teachers is dressing. The boys demand more time than the girls, and the younger children more time than the older ones. With advancing age in the children, toilet habits show a definite decrease in a teacher's time. It is interesting to compare the time taken by the two consecutive activities listed. "Correction" means verbal correction of undesirable behavior. This shows an increase with advancing age, whereas "removal from group" decreases with age. In other words, the two-year-old children are more apt to be removed physically from the group by way of correction, while the four-year-olds are controlled to a larger extent by verbal suggestion. In both kinds of correction, the boys take more of the teacher's time than do the girls. If we include the small number of records we have under "prevention of bodily activity" we find that these figures follow the trend of "removal from the group."

When we divide the data on the grounds of whether the attention of the teacher was given at her own initiation or because the child himself asked for it, we obtain Table II in which "T" means "Teacher-initiated attention" and "C" means "Child-initiated." In this table the figures have been combined into the main types of activity without regard to the particular kind of attention given; thus under "Lunch" we combined all the time spent on the child at the luncheon table whether it was talking with the child, serving him, helping with the eating utensils, or, perhaps, removing him from the room.

TABLE II

PERCENTAGE OF POSSIBLE TIME SPENT AT DIRECTING DIFFERENT ACTIVITIES

	Lunch		Naps		Toilet		Free Play: Yard		Free Play: Indoors	
Age	T	C	T	C	T	C	T	C	T	C
2	.36	.07	.61	.00	1.19	.07	.38	.05	1.13	.21
3	.30	.09	.45	.00	.86	.21	.27	.17	.57	.37
4	.11	.09	.78	.02	.43	.20	.24	.17	.52	.48
Sex										
Boys	.15	.05	.90	.01	.86	.12	.34	.12	.74	.30
Girls	.28	.10	.46	.01	.62	.22	.21	.18	.58	.43

From Table II we may draw a number of conclusions. Of the time devoted to the children at luncheon, most is given to the younger children.

Girls take more of the teacher's time at luncheon than do boys. At first thought, it might seem that this was due to the greater desire for conversing which girls are popularly supposed to have, but Table I showed that there is no difference in the social conversation carried on with the two sexes, and that the boys exceed the girls in time taken for suggestions and corrections. It must be, therefore, that in this group at least we have more eating problems among the girls than in the group of boys.

When we consider the time devoted to the children at nap-time, we find that practically all such attention is teacher-initiated. In other words, at nap-time the child does not ask for help or attention and if he is quiet he is ignored by the teacher. If, however, he is a disturbing factor to the rest of the group, he gets considerable unrequested attention from the teacher. A few of the four-year-old children attempt occasionally to enter into conversation with the teacher at this time and this accounts for the "C" time at that age. The boys clearly take more of the teacher's time during naps than do the girls, probably because they are less ready to lie quietly. The least time of all is taken by the three-year-old children. Most of these children are still sleeping at nap-time and they are well enough acquainted with the routine to drop off to sleep quietly. Some two-year-olds may fuss a little at nap-time, others are thumb-suckers, and still others sometimes roll off the bed and so need a little special attention. The attention given to the four-year-olds is largely devoted to teaching relaxation and to keeping them quiet enough to let others rest.

If we limit ourselves to the teacher-initiated time, the time given to children at the toilet (including the lavatory) falls off as would be expected with advancing age. It is clear from the tables that the two-year-old children seldom ask for help in the toilet and wash room, whereas the older children are more ready to recognize need for help and to ask for it. The boys take more teacher-initiated time, while the girls require more child-initiated time in the toilet room. Doubtless, one reason for the boys asking for less help at the toilet is the fact that they can arrange their clothing for urination without disturbing any buttons while girls usually have at least two buttons to unfasten.

The four columns at the right in Table II give the records for free-play periods on the playground and indoors. It is clear that free play inside takes more attention from the teacher than does free play outdoors. In both situations, the amount of time required falls off with advancing age, but this falling off is more marked for the indoor play than for the out-

door. In both places, boys take more teacher-initiated time than do the girls, while the girls take more child-initiated time. The child-initiated time increases with advancing age and, like the teacher-initiated time, is greater for indoor than for outdoor play. These figures go to prove what most nursery schools have felt already, that the children require closer supervision indoors than on the playground.

Two main conclusions may be drawn from Table II. First, that as the children grow older the teacher needs to initiate less and less the attention paid to them, while at the same time the children are becoming more and more ready to ask for help when they need it or to ask for help when they do not really require any. Second, with the exception of lunch time, boys require more teacher-initiated time than the girls, and with the exception of nap-time, when the two are equal, girls require more child-initiated time. We shall refer to this point later when we discuss the data obtained on kindergarten children.

Table III gives the rank-order correlation coefficients for teacher's time with chronological age and mental age of the children.

TABLE III

CORRELATION COEFFICIENTS OF TIME GIVEN BY THE TEACHER WITH CHRONOLOGICAL AND MENTAL AGES OF THE CHILD

	with CA	with MA
Total "T" time	—.42	—.41
Total "C" time	.32	.19
Luncheon "T" time	—.62	—.53
Luncheon "C" time	.30	.25
Naps "T" time	—.01	—.09
Naps "C" time	.53	.30
Toilet "T" time	—.69	—.69
Toilet "C" time	.34	.36
Free play outdoors "T" time	.01	—.10
Free play outdoors "C" time	.25	.04
Free play indoors "T" time	—.22	—.28
Free play indoors "C" time	.33	.19

From Table III it is evident that "T" time, the time which the teacher gives the child on her own initiative, with one exception, shows negative correlations with both chronological and mental ages. In other words, the teacher goes to older children with help and suggestions less frequently or for shorter periods than she goes to the younger children. The figures for mental age are approximately the same as those for chronological age. On the other hand, the "C" figures give all positive correlations with advancing age. As the children grow older, then, they more frequently go to the teacher to express their needs or desires.

The activities which most clearly show a relationship with age are: toilet routine (going to the toilet, washing face and hands, brushing teeth, combing hair) and the luncheon hour. There are greater differences between "T" time and "C" time at indoor free play than there are at outdoor free play.

TABLE IV

CORRELATIONS OF THE TIME SPENT ON VARIOUS CHILDREN BY DIFFERENT TEACHERS

	"T" time	"C" time
Miss A and Miss B	.36	.44
Miss A and Miss C	.65	.63
Miss A and assistants	.41	.51
Miss B and Miss C	.22	.26
Miss B and assistants	.73	.45
Miss C and assistants	.34	.54

Of the teachers reported in Table IV, Miss A was the head nursery school teacher with four years of experience; Miss B and Miss C were assistant teachers with one year of experience; the assistants were practice teachers expecting to take nursery school positions the following year. The discrepancies between Miss B and Miss C may be explained in part by stating that for some activities these two teachers worked with different groups, while Miss A sometimes joined Miss B's group and sometimes that of Miss C. Miss B and Miss C were also assigned to different sleeping rooms. It is natural, therefore, that certain children should demand more time from Miss B while others took more from Miss C. Why the assistants should agree more closely with Miss B than with the other teachers in "T" time is not clear, for there was no apparent attempt on their part to imitate one teacher more than another. It is evident that Miss A and Miss C agree more closely than either of them agree with other teachers. This may be due in part, at least, to the fact that the two were very intimate friends, shared an apartment together, and spent considerable time in talking over the events of the day and the methods of control which seemed to have the best effect on various children.

If we calculate the percentage of the teacher's time which is spent in close personal attention given to some one individual child, we obtain for nursery school teachers: Miss A, 31 percent; Miss B, 41 percent; Miss C, 29 percent; and assistants, 36 percent.

After the records had been collected, Miss A was asked to report for each child the reasons why she frequently paid attention to him. From this report it appears that there are three types of nursery school chil-

dren who take more than the average amount of time from the teachers: (1) the disobedient, defiant, or negativistic child; (2) the very talkative child; and (3) the child who exhibits some special problem such as thumb-sucking or many food dislikes. Conversely, the child who takes less than the average amount of the teacher's time is the child who is not a chatter-box, who is ready to follow suggestions, and who displays no undesirable habits which should be checked.

The data just reported seemed to be so significant for the nursery school that the original problem was expanded to include a series of similar observations of kindergarten children. These observations were taken in the spring of 1930 of a morning kindergarten group of 26 children and an afternoon kindergarten group of 14 children. In the morning school, Miss D, the head kindergarten teacher, was observed for 804 minutes and Miss E for 765; in the afternoon school Miss D was observed for 671 minutes and Miss F for 675.

It was found to be impossible to classify the types of attention given the children as closely as was done in the case of the nursery school. Most classifications of activity fell under the heading "conversation." Record was kept of time initiated by the teacher and that initiated by the child as in the case of the nursery school. Even this classification, however, was not fully satisfactory because there were many cases where the opening remark in a conversation was made by the child, but the conversation was kept alive and redirected by the teacher in subsequent remarks. Such changes could not very well be recorded and so the records stand under "T" or "C" according to whether the original initiation came from teacher or child.

The kindergarten under observation is conducted on an informal plan with the emphasis on self-help, formulation of plans, and for carrying out worthwhile construction, with a minimum of formalized work or construction according to definite rules laid down by the teacher. The children do not have their luncheon at school and it has not seemed feasible to attempt consideration of different parts of the schedule, such as the "group meeting," "work period," and so on in the present report. The forty children observed in the kindergarten ranged in chronological age from the youngest at 59 months to the oldest at 74 months, with the mean at 5 years 5.3 months and a mean variation of 3.2 months. The distribution of chronological ages was as follows: 54 to 59 months, 1; 60 to 65 months, 20; 66 to 71 months, 17; 72 to 77 months, 1.

TABLE V

RELATIONSHIP BETWEEN CHRONOLOGICAL AGE OF KINDERGARTEN CHILD AND AMOUNT OF ATTENTION RECEIVED

CA	Mean Percentage T-time	C-time
54-59 months	1.62	.53
60-65 months	.83	.87
66-71 months	.53	.62
72-77 months	.51	.87

From Table V we find that the younger children take more time from the teacher, both T-initiated and C-initiated, although the difference is more marked for the T-time. The same difference is still more marked if, instead of dividing the children on the basis of chronological age, we divide them into those who have had kindergarten experience previous to the present term and those who have but recently entered kindergarten. For these groups the figures are: children without previous kindergarten experience, T-time, 1.11; C-time, .97; children with previous kindergarten experience, T-time, .70; C-time, .79.

Much the same conclusion may be drawn from a correlation of the total percentage of teacher's time and the chronological age of the child. This correlation of —.53 shows that the older the child the less time he takes from the teacher.

If we calculate the ratio of C-time to T-time we obtain for the successive age groups: .33; 1.05; 1.17; and 1.71. The same general tendency was shown in the nursery school records for the nursery school children where the ratios for the three age groups, 2, 3, and 4 are: .11; .34; and .46. If these ratios were 1.00 it would mean that for that age group exactly as much T-time as C-time was given to the children. Figures over 1.00 mean more C-time than T-time; and figures below 1.00 mean, of course, the reverse. Since the two youngest children in the kindergarten fall also into the oldest age group of the nursery school, we may combine the records of the two schools and obtain Table VI.

TABLE VI

DISTRIBUTION OF $\frac{\text{C-TIME}}{\text{T-TIME}}$ RATIOS BY SEX AND CHRONOLOGICAL AGE

C.A.	Boys No. Cases	Boys Ratio	Girls No. Cases	Girls Ratio
24-35 months	2	.09	3	.15
36-47 months	6	.26	8	.36
48-59 months	10	.24	6	.72
60-65 months	10	.87	10	1.32
66-71 months	10	.88	7	1.57
72-77 months	1	1.71		

It is evident from Table VI that, with the exception of one very small inversion in the case of the boys, for both sexes the ratio of C-time to

T-time increases with advancing age. In other words, the older the child gets, the greater is the amount of C-time in comparison with T-time. If the ratios for the two sexes are compared, it will be seen that the girls give consistently higher ratios than the boys. Since this ratio increases with chronological age, it was thought that the higher scores for the girls might be due to more advanced mental development in the girls; Table VII was, therefore, compiled to show the distribution of C-time-T-time ratios with mental age.

TABLE VII

DISTRIBUTION OF $\frac{\text{C-TIME}}{\text{T-TIME}}$ RATIOS BY SEX AND MENTAL AGE

	Boys		Girls	
MA	No. Cases	Ratio	No. Cases	Ratio
24-35 months	1	.03	2	.16
36-47 months	5	.21	5	.28
48-59 months	7	.29	6	.45
60-71 months	13	.62	8	1.41
72-83 months	8	.92	9	1.11
84-95 months	3	1.07	3	1.89
96-107 months	2	.67		

It will be noticed that Table VII gives records for one less girl than does Table VI. The reason for this discrepancy is that one girl had not been given a mental test. From Table VII it is clear that the C-time-T-time ratio for girls continues to exceed that for boys even when mental age is held constant for the two sexes. The higher ratio for girls, therefore, cannot be due to the more advanced mental development of the girls.

The differences in ratios are due both to higher T-times and to lower C-times for the boys, but the difference between T-times for the two sexes is greater than the difference between C-times. We may conclude, therefore that although girls show a tendency to take more teacher's time on their own initiative throughout the age range, this difference is not so great as the difference in T-time. Boys consistently take more T-time. We have no evidence to show how long this continues through the grades.

Each of the three kindergarten teachers was asked to rank the children in order from the one on whom they thought they spent most time to the one on whom they thought they spent the least time, and to state in each case the reason for this time. The correlation coefficients for the morning group (actual record with teacher's estimate) were: Miss D, .70; Miss E, .54; for the afternoon group, Miss D, .49, and Miss F., .48. When the teacher's records are compared with each other, we get correlation coefficients as follows: Miss D and Miss E, .52; Miss D and Miss F, —.10; Miss E and Miss F could not be compared since they were with different groups of children.

When we study the teacher's statements as to why certain children took more than an average amount of time, we find a variety of reasons. Of the three children in the morning group who took most time we find Carrie B said by Miss D. to be "a non-conformist, has something to say on every subject, anything to be different" and by Miss E to show "strong individualism and a tendency to argue when this is interfered with." John W. is said by Miss D to have "many ideas to express, wants adult approval, interferes with rights of others" and by Miss E to be "overly active and aggressive, has to have his forces redirected, contributes things of value." Henry M. is said by Miss D to "annoy others, makes worthwhile contributions but takes much time to express himself, dreams at his work" and by Miss E to "ask for help, interferes with the group."

Teachers' estimates agree for Miss D and Miss E more closely with C-time while for Miss F they agree more closely with T-time.

If we summarize the report of the kindergarten teachers as to why certain children take more than the average and others less than the average amount of the teacher's time, we find:

More than the average:

1. The non-conformist who is ready to do anything to be different, who argues every point, who enjoys having an issue, and who acts silly if no other means will procure the desired attention.
2. The very aggressive child, the bully who annoys others and interferes with the rights of others, frequently the very noisy child.
3. The very slow, deliberate child who sometimes dreams at his work or idles away his time, the child who speaks very slowly.
4. The careless worker who has to be held to his work or the easily discouraged child who asks frequently for help.
5. The child who wants to be near adults, who craves attention and appreciation.
6. The child who is bubbling over with enthusiasm and with worthwhile ideas which he is most anxious to discuss with the teacher.
7. The child who presents some particular problem such as immature speech, awkwardness in handwork, nail-biting, etc.

Less than the average:

1. The quiet, retiring child who enjoys being by himself and who squirms under too close adult supervision.
2. The independent child who has worthwhile plans and asks for help only when he actually needs it, expresses himself briefly and then waits for the assistance and accepts the teacher's suggestions readily, the child who assumes responsibility for his own behavior, who is coöperative and makes no disturbance.

It seems clear from the above analysis that the most superior pupils in a kindergarten may take either more or less than an average amount of the teacher's time, depending usually on whether or not the child in question is talkative or not.

A calculation of the percentage of the teacher's time that is given to some particular individual child gives: Miss D, 27 percent, Miss E, 25 percent, and Miss F, 24 percent. When we compare these figures with the corresponding figures for nursery school teachers, we find that a somewhat greater percentage of the nursery school teacher's time is taken up with individual attention. It was, as has been said, impossible to measure the time the teachers spent in thinking about different children or in planning their course of action. The time recorded here was merely time in which the teacher was talking to the child or giving him assistance of some kind.

It so happened that eight of the nursery school children studied in the observation were in the kindergarten groups observed in the second half of the study. If we rank these children in the order in which they took most time from the nursery school teachers and compare this order with the order in which they are taking time from the kindergarten teachers, we obtain a rank-order correlation of —.21. Thus we cannot predict from the record in nursery school whether or not the child will take more or less than the average amount of the kindergarten teacher's time. This emphasizes the difference between the two schools. Children who take more than the average amount of a nursery school teacher's time are more often the "worst pupils" either because of lack of development or some behavior difficulties. Frequently, however, the "best pupils" in the kindergarten take more than the average amount of the teacher's time.

HOW SHALL WE PREDICT HIGH-SCHOOL ACHIEVEMENT?

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Adequate guidance, both educational and vocational, is the most acute problem of the modern high school. The vastly increased enrollments and the enormously expanded curricula within the high school, together with the constant multiplication and diversification of the activities of life outside, have conspired to bring this about. Upon this point all authorities are agreed.

There is also general agreement upon a second point, namely, that intelligent guidance depends upon the ability to discover the relationship between the future and the present, and to predict the one in terms of the other. For example, a recent book on adolescent psychology makes this statement: "The prediction and control of adolescent behavior are the two most important problems upon which the psychology of adolescence should give information."[1] Upon the same point a leading book in measurement says: "Science holds prediction as its most important aim and prognosis is the ultimate aim of endeavor in the scientific study of education."[2]

How, then, shall we predict high-school achievement? What are the factors in the present that give the clue to the future? Three different bases of prediction have been suggested:

1. Character of personality ratings. As a rule these take the form of teachers' estimates of industry, attitude, interest and the like.

2. Intelligence test scores. These may be either scores on "general" intelligence tests that yield the mental age and IQ, or "special" intelligence tests that aim to measure aptitude along some particular line.

3. Previous academic record. This may be afforded by standardized tests in various school subjects, by the teacher's marks in the grade school, or by a combination of various factors from the grade school record, including such items as age at finishing the elementary school, time required to do so, and attendance record from year to year, as well as teachers' marks.

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[1] Brooks, F. D. *The Psychology of Adolescence* (Boston: Houghton Mifflin Company, 1929), 544 pp.

[2] Symonds, P. M. *Measurement in Secondary Education* (New York: The Macmillan Company, 1927), 363 pp.

Which basis is best? That is the big question. Unfortunately, there is no general agreement as to the answer. For example, Ruch and Stoddard[3] summarize the situation as follows:

1. "Teachers' marks are the least promising.....

2. "In theory, at least, prognosis and aptitude tests are the best.....[but] since so few good tests of this type are available at present, prognosis tests will seldom be the choice of the high-school administrator.

3. "In the absence of available experimental evidence, then, the safest general practice in school classification is probably the general intelligence test, at least for the more highly verbal or linguistic school subjects."

On the other hand, such excellent authorities as Symonds, Brooks, and Kefauver, disagree. Symonds,[4] for example, summarizes his conclusions as follows:

1. "Intelligence tests are better than separate tests of elementary school subjects as predictors of high-school success, but are not so good as elementary school marks.

2. "Ratings of character and ability qualities have been found to give high correlations by Kelley and Flemming.....[but] the unreliability of ratings in general leads one on general principles to discredit the predictive value of teachers' ratings.

3. "Not much better results may be expected from a specially designed prognosis test for predicting average school success over a general intelligence test, but a specially designed prognosis test is slightly superior to a general intelligence test for predicting success in any one subject..... Taking the normal situation, school marks are preferable to tests for prediction of success in high school."

Brooks'[5] position is summarized as follows:

"The best single basis for predicting scholarship (i.e., school marks or other measures of scholastic attainment) in high school is the average mark received in the grades immediately preceding the high school. Next in order of predictive value are teachers' estimates (of industry, school attainment, intelligence, persistence, conscientiousness, etc.), intelligence and achievement tests, and chronological age."

The following quotation from Kefauver[6] indicates that his position is very similar to that of Brooks:

"The most significant single source of information for predicting success in the first year of the junior or four-year high school is the judgment of the teachers in the elementary school.....Whatever the combination of factors used for dis-

[3] Ruch, G. M., and Stoddard, G. D. *Tests and Measurements in High-School Instruction* (Yonkers: World Book Company, 1927), 40 pp.

[4] Symonds, *op. cit.*, pp. 398-407.

[5] Brooks, *op. cit.*, p. 558.

[6] Kefauver, G. M. "The Validity of Bases for Forming Ability Groups," *Teachers College Record*, XXXI (November, 1929), pp. 111-13.

tributing pupils to ability groups it should contain either a composite of the marks in the elementary school or a rating of capacity by the teacher."

It will be noted that the first of these authorities places teachers' marks at the bottom of the list, while the others place them at the top. When such serious disagreement as this occurs, a careful examination of what constitutes a satisfactory basis of prediction is in order. Briefly stated, a satisfactory prediction meets three conditions, namely, validity, reliability, and usability. The most important of these is validity, for by validity is meant truthfulness. To what extent do the predictions actually come true? For example, if the prediction is made that John will do well in high school, that Mary will make an average record, while Tom will make a complete failure, to what extent do they actually turn out that way? Insofar as the prediction is realized, it is considered valid.

By reliability is meant consistency of prediction. To what extent do the predictions agree with themselves? For example, do they tell the truth all of the time, none of the time, or just some of the time? Or, may we expect to get the same answer regardless of its truthfulness,

TABLE I

CORRELATIONS FOR PREDICTING SCHOLARSHIP IN CERTAIN JUNIOR HIGH-SCHOOL SUBJECTS[1]

	Chron. Age	Av. Marks in Grade V	VI	VII*	VIII	T'ch'rs.* Est. of Intell.	MA Ill.	MA Nat'l	Th.-McC. Read.*	W.-McC. Arith.*
Grade VII, N = 287										
1. English	−.43	.49	.63			.59	.40	.42	.35	.28
2. Mathematics	−.36	.34	.45			.57	.43	.39	.27	.49
3. Geography	−.38	.41	.55			.65	.34	.36	.29	.28
4. History	−.35	.41	.52			.69	.38	.42	.29	.31
Av. mark	−.43	.47	.61			.72	.44	.44	.34	.38
Grade VIII, N = 93 (Academic Course)										
1. English	−.45	.48	.62	.71		.38	.39	.47	.30	.32
2. Mathematics	−.39	.43	.48	.76		.42	.43	.41	.17	.29
3. Geography	−.33	.43	.44	.63		.39	.25	.28	.18	.21
4. History	−.55	.47	.60	.82		.53	.39	.41	.31	.20
5. Latin	−.35	.55	.51	.67		.29	.25	.29	.20	.16
6. Genl. Science	−.39	.45	.57	.73		.46	.32	.30	.03	.20
Av. mark	−.45	.57	.64	.88		.53	.41	.42	.24	.31
Grade IX, N = 73 (Academic Course)										
1. English	−.30	.34	.54	.69	.79	.36	.23	.28	.18	.04
2. Mathematics	−.24	.28	.25	.45	.61	.23	42	.30	.04	.30
3. Latin	−.21	.29	.36	.50	.71	.24	.22	.25	.21	.14
4. French	−.40	.38	.48	.67	.73	.30	.26	.33	.18	.17
5. Civics	−.14	.19	.15	.43	.50	.28	.22	.24	.21	.20
Av. mark	−.24	.35	.42	.64	.78	.33	.32	.32	.18	.20

* These tests and estimates were given at the very beginning of Grade VII. Average mark in Grades VII, VIII, and IX is the average of each pupil's marks in the subjects listed for each grade in column 1 of this table.

[1] From *The Psychology of Adolescence* by Fowler D. Brooks, copyright 1929. Reprinted by permission of special arrangement with Houghton, Mifflin Co., Publishers.

whenever and wherever we ask for it? Insofar as the predictions are stable and constituent they are said to possess reliability. The validity of a prediction is limited by its reliability, although high reliability in itself does not guarantee high validity.

By usability is meant practicality. Are the predictions capable of being arrived at and used with sufficient ease to make them practical, or do they call for too great an expenditure of time and energy for the returns they yield? The extent to which they meet this test determines their usability.

When measured by these three standards or criteria, how do the bases of prediction named above compare in merit? This will now be considered in some detail.

First, how valid, reliable, and usable are estimates of character and personality? Brooks[8] has shown that teachers' estimates of intelligence made at the beginning of the seventh grade are considerably better than either of two widely used intelligence tests for that grade, and are about the same as intelligence tests for the next two grades. Table I gives a summary of Brooks' findings. For the seventh grade the correlations of mental age on both the Illinois and National Intelligence Tests with teachers' marks in various school subjects range from .34 to .44, whereas those for teachers' estimates of intelligence range from .57 to .72. For the same grade Kelley[9] found teachers' estimates of intelligence to correlate .72. In an extensive study Flemming[10] found the correlation of teachers' estimates of intelligence to be .80 for junior high school and .70 for senior high school. Kelley found the correlation between other character and personality traits and achievement in junior high school varied from .58 to .63. Flemming found the estimates of other traits to correlate with junior high-school achievement from .21 to .74, and with senior high-school achievement from .30 to .50. When it is taken into account that both Kelley's and Flemming's studies were made upon teachers' ratings in the Horace Mann School, an experimental school of Teachers College, where the qualifications of the teachers are unusually high, the magnitude and, particularly, the constancy of these correlations do not appear especially impressive. Moreover, in these studies the same teachers who made the estimates gave the marks, so they are

[8] Brooks, *op. cit.*, p. 566.

[9] Kelley, T. L. *Educational Guidance.* New York: Teachers College, 1914.

[10] Flemming, C. W. *A Detailed Analysis of Achievement in the High School.* New York: Teachers College, 1925.

doubtless spurious to some degree, because the teachers probably considered the same factors in estimating character and intelligence as they did in estimating achievement, and to that extent they were bound to agree, being measures of the same thing.

In this connection it is interesting to note that Kefauver[11] found that teachers' estimates of capacity correlated .59 with average of marks in fifth and sixth grades but only .15 with scores on the Multi-Mental Scale. The surprising reduction of the correlation between the estimates of Brooks' seventh grade teachers and the marks of the eighth and ninth grade teachers to an average of .36, as compared with the estimates of these same teachers and their own marks in the seventh grade, which averages .65, strongly suggest this fact. Under ideal conditions teachers' estimates will appear to yield rather valid predictions of achievement where the achievement is in the classes of these same teachers, but even here the consistency of these correlations is low. Indeed, under ordinary school conditions, where the estimates of one set of teachers are to be used as the basis for predicting achievement with another set of teachers, these estimates will appear to rank high on only one criterion, namely, usability. They are relatively easy to secure, but this quality is of little importance where validity and reliability are lacking. It would seem, therefore, that character and personality ratings under normal school conditions do not adequately meet the three criteria of a satisfactory basis of prediction.

The choice of the practical school man, then, narrows down to two possibilities, intelligence tests and previous academic record. Special intelligence tests or aptitude tests can be disposed of with a few words, for at present they present only two practical difficulties. In the first place very few of these tests exist, and in the second place, most of those that do exist possess but little if any higher reliability and validity than do general intelligence tests. For example, the validity of the Wilkins Modern Prognosis Tests, one of the best known, apparently varies from below .50 to around .75. Furthermore, in the main, these tests stand well below the general intelligence tests in usability, for many of them are really batteries of tests which are expensive, both in money and time. As it will always require a separate test for each high-school subject, whereas one general intelligence test will suffice for all school subjects, the former will have to afford considerably higher correlations with suc-

[11] Kefauver, *op. cit.*, p. 111.

cess in these subjects to justify their use. This they do not do at the present time. If one is going to use an intelligence test, especially where time and money are important considerations, it should probably be a general intelligence test. Before further consideration of the merits of general intelligence tests are presented, a few words about previous academic record, the third basis of prediction, are in order.

The use of batteries of educational tests as bases for predicting high-school success possesses certain practical limitations. To begin with, batteries suitable for this purpose are limited in number. They are also expensive in money and time. Furthermore, there is no convincing evidence to show that their correlation with success in high school is higher than that afforded by teachers' marks, which are already available without cost wherever cumulative records are kept. For example, Wright[12] reports a correlation of .65 between scores on the Indiana Composite Achievement Test and the average mark in four subjects in the first year of high school for 339 pupils in ten high schools. He also gives some comparative data for 54 pupils who took the Indiana Composite Achievement Test in April, 1927, the Stanford Achievement Test and the Otis Self-Administering Intelligence Test, presumably in the fall of 1927, and teachers' final marks in the eighth grade based upon daily work and the Indiana Composite Achievement Test which they had recently given and scored. The correlations with the average mark in four subjects in high school for the first semester of 1927-28 are for these four measures, respectively, .59, .43, .39, and .74. It is worthy of note that the correlation between high-school marks and scores on the general intelligence test is the lowest of all, while the correlation between teachers' marks in the high school and the grade school is the highest of all. This is only a straw, but it may indicate which way the wind blows. With the more extensive use of objective tests, both standardized and non-standardized, it seems a reasonable expectation that teachers' marks will become not only more valid and reliable measures of present and past achievement, but also increasingly valuable bases for predicting future achievement. For these reasons, if one is to attempt to predict future achievement from past achievement, which on the face of it seems the logical thing to do, it would be better to use the teachers' marks in

[12] Wright, W. W. "The Development and Use of a Composite Achievement Test," *Bulletin of the School of Education*, Indiana University, Vol. V, No. 3, pp. 71-77.

the grade school than the scores on a comprehensive battery of achievement tests.

The choice of the best basis for predicting high-school achievement has thus been narrowed down to general intelligence tests and previous school records as indicated by teachers' marks and other factors on the office record cards. How do the two compare with regard to validity, reliability, and usability? As the previous school records of the pupils are already available when they report to high school, it is clear that such records excel the other bases in usability, but the relative merits of the two in validity and reliability present a more troublesome problem, as the literature of both is quite extensive.

To begin with, it will be well to consider separately the problem of predicting success in the first year of senior high school, or the ninth grade, from the problem of predicting success in the later years of high school. Brooks[13] has recently compiled data which show that the achievement of pupils in the later years of high school in English, foreign languages, mathematics, social and natural sciences can be predicted better by the marks received in the same subject during the preceding year than by a general intelligence test. There would appear, therefore, to be no reason for employing intelligence tests in the high school where previous marks in the same field are available. This leaves only the problem of predicting achievement in the first year, which, however, is the most acute problem in high-school prognosis. From the best available evidence about twenty percent of pupils entering high school drop out during the first year. It is entirely possible that many of these pupils would continue in high school under a better scheme of guidance. Even if they did not, it would be highly desirable to be able to recognize these students at the outset so as to provide them with the best type of education possible during their brief stay in high school. Then, too, it is highly desirable to know at the beginning of the year those who are going to succeed in varying degrees, so as to classify and section them to the best advantage.

What, then, is the best way to predict achievement in the first year of high school? Do general intelligence tests or previous school records give the best basis of prediction? Table II brings together the results of a dozen studies, involving a dozen different intelligence tests. The correlations between intelligence test results and the average achieve-

[13] Brooks, *op. cit.*, pp. 567-572.

ment in the first year of high school varies from .12 to .69, with a median of .48. The highest of these correlations may be considered to afford fairly valid predictions, but the lowest of them are of no practical value whatsoever. Even the median is only about thirteen percent better than that afforded by chance. Where fluctuations are as great as these results show intelligence tests to be, and with an average prediction no higher than this, it must be concluded that intelligence tests are neither a very truthful nor a very consistent basis for predicting average achievement for the first year of senior high school.

TABLE II

CORRELATION BETWEEN INTELLIGENCE AND SUCCESS IN THE FIRST YEAR OF HIGH SCHOOL

r	N.	Scores	Test Used	Author*
.69	57	I. Q.	Otis S-A	Miller (12)
.62	57	I. Q.	Pressey Sr. Cl.	Miller (12)
.61	57	I. Q.	Terman Group A	Miller (12)
.60	57	I. Q.	Miller B	Miller (12)
.59	57	I. Q.	Miller A	Miller (12)
.59	157	Raw Score	Otis	Otis (13)
.58	74	Raw Score	Otis A & B	West (19)
.56	57	I. Q.	Haggerty, D 2	Miller (12)
.56	57	I. Q.	Binet-Simon	Miller (12)
.55	107	I. Q.	Binet-Simon	Proctor (14)
.54	153	M. A.	Otis	Keener (10)
.53	57	I. Q.	Illinois 1	Miller (12)
.53	49	C. B.	Otis	Smith (17)
.50	55	Raw Score	Haggerty, D.2	Haggerty (6)
.49	57	I. Q.	Dearborn II-C	Miller (12)
.49	67	Raw Score	Terman Group	Jordan (8)
.48	67	Raw Score	Miller	Jordan (8)
.48	67	Raw Score	Army Alpha	Jordan (8)
.45	67	Raw Score	Otis	Jordan (8)
.42	57	Raw Score	Illinois	Franzen (5)
.41	57	Raw Score	National B	Franzen (5)
.39	54	Raw Score	Otis S-A	Wright (20)
.37	79	Per. Rank	Terman	Ross (15)
.33	82	Per. Rank	Otis	Hooks (7)
.32	73	M. A.	Illinois	Brooks (2)
.32	73	M. A.	National	Brooks (2)
.31	57	Raw Score	Otis	Franzen (5)
.30	57	Raw Score	Terman	Franzen (5)
.29	57	Raw Score	National	Franzen (5)
.29	57	Raw Score	Haggerty	Franzen (5)
.29	57	Raw Score	Dearborn	Franzen (5)
.24	57	Raw Score	Dearborn	Franzen (5)
.12	57	Raw Score	Myers	Franzen (5)

* Number after author's name indicates complete bibliographical reference given at the close of the article.

Table III summarizes the results for a half dozen studies, showing the correlations between intelligence test results and achievement in three separate high-school subjects. Here the range in correlation is from .18 to .72, with the median at .39. The situation appears to be even worse for the individual high-school subjects than for the average of all subjects together.

TABLE III

CORRELATIONS BETWEEN INTELLIGENCE AND ACHIEVEMENT IN ENGLISH, MATHEMATICS, AND LATIN IN THE FIRST YEAR OF HIGH SCHOOL

Subject	r	N	Scores	Test Used	Author*
English	.72	164	Raw Score	Terman Group	Bright (1)
English	.46	79	Per. Rank	Terman Group	Ross (15)
English	.43	67	Raw Score	Miller	Jordan (8)
English	.42	67	Raw Score	Terman Group	Jordan (8)
English	.42	82	Per. Rank	Otis	Hooks (7)
English	.41	67	Raw Score	Otis	Jordan (8)
English	.39	67	Raw Score	Army Alpha	Jordan (8)
English	.28	73	M. A.	National	Brooks (2)
English	.23	73	M. A.	Illinois	Brooks (2)
Mathematics	.60	50	Per. Rank	Terman Group	Elder (3)
Mathematics	.50	142	Per. Rank	Terman Group	Bright (1)
Mathematics	.42	79	Per. Rank	Otis	Ross (15)
Mathematics	.42	73	M. A.	Illinois	Brooks (2)
Mathematics	.37	47	Raw Score	Army Alpha	Jordan (8)
Mathematics	.34	47	Raw Score	Miller	Jordan (8)
Mathematics	.34	47	Raw Score	Terman Group	Jordan (8)
Mathematics	.31	82	Per. Rank	Otis	Hooks (7)
Mathematics	.30	73	M. A.	National	Brooks (2)
Mathematics	.28	47	Raw Score	Otis	Jordan (8)
Latin	.65	56	Raw Score	Terman Group	Bright (1)
Latin	.49	108	I. Q.	Terman Group	Jordan (9)
Latin	.33	82	Per. Rank	Otis	Hooks (7)
Latin	.25	73	M. A.	National	Brooks (2)
Latin	.22	73	M. A.	Illinois	Brooks (2)
Latin	.18	79	Per. Rank	Terman Group	Ross (15)

* Number after author's name indicates complete bibliographical reference given at the close of the article.

It must be granted that intelligence test scores have shown up disappointingly both as regards validity and reliability. It remains to be seen whether or not previous grade school records can do any better.

Five years ago one of the writers made an extensive study of the predictive value of grade school records. A similar, but less extensive, study was made by the other writer a year ago. The essential results of these studies are given in Table IV. The reader should keep in mind throughout the subsequent discussion that a pupil's grade school record, as it occurs on the cumulative record card in the principal's office,

TABLE IV

SUMMARY OF CORRELATIONS OF GRADE SCHOOL COMPOSITE SCORES WITH HIGH-SCHOOL ACHIEVEMENT

Grade School Composite	First Year High-School Achievement*					
	New Rochelle, New York				Des Moines, Ia.	Kentucky Towns
	1916	1917	1918	1919	1922	1927
General Average	.68	.67	.56	.65	.69	.69
English	.60	.67	.67	.60	.61	.67
Latin	.58	.73	.57	.64	.61	.53
Mathematics	.42	.51	.43	.51	.51	.43

* The correlations for New Rochelle and Des Moines are from Ross, C. C. *The Relation Between Grade School Record and High-School Achievement*, Teachers College, Columbia University, 1925, p. 68. The correlations for the Kentucky towns are from Hooks, N. T. "A Study in High-School Prognosis," M. A. Thesis, University of Kentucky, 1928, p. 47.

includes many significant factors other than teachers' marks, such as age at completing eighth grade, grade-progress, and attendance. A common error has been to think that the only things about the grade school record that are important are the "grades" or "marks."

The procedure in these studies may be briefly summarized. The records of all the students who finished the eighth grade in New Rochelle, N. Y., in June, 1917, were studied in order to discover the best combination of grade school factors that would predict success in first year high school, and also success in the individual subjects, English, Latin, and mathematics. In all, some two hundred factors from each pupil's record were considered, either singly or in combination. The simple correlations of each of the factors with these measures of high-school achievement were first obtained. For example, these correlations varied from —.38 for age at the end of the eighth grade and first year English to .66 for average marks during the grade school and first year English. The correlation between the average of all marks in the grade school and the average mark in the first year high school was .60.

Moreover, by combining five factors by the use of the multiple ratio correlation technique, it was possible to predict the average mark in the first year high school to the extent of a correlation of .67 for the year 1917, and by a combination of four factors from the grade school record it was possible to predict the English marks in the first year of high school to the extent of the correlation of .67 for the same year. A glance at Table II shows that only one study found the correlation as high as that between the intelligence test scores and the average mark of the first year of high school, and an examination of Table III shows that only one study found that intelligence test scores and marks in four individual subjects of the first year high school correlated as highly as that. These same factors were then combined according to the weights determined for 1917 in the case of all students in New Rochelle for the years 1916, 1918, and 1919, for a large group of students in Des Moines, Iowa, for 1922, and for a representative group of students in two Kentucky towns for 1927. All told, more than seven-hundred students have been included. It will be noted (Table IV) that the correlations between the grade school composites and the average achievement in the first year of high school for these groups are, respectively, .68, .56, .65, .69, and .69. In a similar fashion the correlations for English, Latin, and mathematics are given in this table. The weights of the grade school factors in the various composites are given in Table V. It is worthy of

note that only five of these factors are teachers' marks in school subjects, and one is an estimate of effort, while four of them, namely, age, grade-progress, and attendance in two grade groups, are entirely objective factors. An examination of this table will disarm the critic who would dismiss the grade school record as a basis of prediction on the ground that it is "entirely subjective, a matter of pure opinion, entirely unreliable."

TABLE V

FACTORS OF THE GRADE SCHOOL RECORD AND WEIGHTS AT WHICH THEY ENTER INTO THE COMPOSITE SCORES FOR PREDICTING ACHIEVEMENT IN THE FIRST YEAR OF HIGH SCHOOL

Factor	Weights in Composites			
	Average General	English	Latin	Mathematics
Age at end Gr. 8	−3	−6	−5	
Grade-progress			−7	5
English, Gr. 4-6	6	10		7
English, Gr. 7-8		10	10	
Arith., Gr. 7-8	4		4	9
Spec. Sub., Gr. 7-8		6		−7
History, Gr. 5-6			10	
Effort, Gr. 7-8	6			
Days Pres., Gr. 2-3			−5	5
Days Pres., Gr. 4-6	−4		−9	

How, then, do these compare with similar results obtained by the use of general intelligence tests? It will be recalled that there are three qualities of a satisfactory prediction, namely, validity, reliability, and usability. The results presented here indicate the superiority of previous academic record on all these points. Under most favorable conditions the validity of intelligence tests seems about equal to that of previous school record, but under typical conditions it falls below. It is, however, on the factor of consistency, or stability, that intelligence tests make the poorest showing. Where correlations vary from .12 to .69, as has been the case in the studies reported for intelligence tests, what assurance has one that the results on his particular situation may not be at the low end of the scale rather than the upper? Of course there can be no such assurance. The condition is not unlike that where one is asked to believe the statement of a person who is known to tell the truth *some* of the time. The trouble with this is that no one can tell when he may be lying. As to usability, the previous school record is, or at any rate ought to be, available for use in prediction with no cost in money and with little expenditure in time and effort. In view of these considerations, then, it would seem to be the part of wisdom to utilize the previous record of the pupil as the best basis for predicting his

future record. Indeed, it should not be surprising to discover that in the history of the individual, as in the history of the race, the best way to judge the future is by the past.

SUMMARY

1. Adequate guidance, one of the most acute problems in the modern high school, is dependent upon the ability to predict high-school achievement.

2. There is a wide difference of opinion among educational authorities as to whether general intelligence tests, special intelligence or aptitude tests, character or personality ratings by the teachers, achievement tests, or previous school record, affords the best basis of prediction.

3. That basis of prediction is best that best satisfies three criteria, namely, validity, reliability, and usability.

4. Data from this and other studies indicate (1) that the most valid or truthful basis for predicting high-school achievement in the first year of senior high school is a combination of factors from the pupil's grade school record, including age, grade-progress, and attendance, as well as teachers' marks, the correlations averaging above .60; (2) that the grade school record affords a more reliable or consistent basis of prediction than any other available, the correlations in three widely-scattered school systems showing remarkable stability; and (3) that without question the grade school record of the pupil is the most usable or practical of all bases for prediction, being available wherever cumulative records are kept, without cost and with a minimum expenditure of time and effort.

5. The authors conclude, therefore, that in the history of the individual, as in the history of the race, the only way to judge the future is by the past, and that at the present time the best measure of a pupil's past at the time he enters high school is his grade school record.

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THE EQUALITY OF UNITS IN EDUCATIONAL MEASUREMENT COMPARED

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AN examination of the literature will reveal at least three very commonly held beliefs concerning the units employed in educational measurement. First, there is the notion that the units chosen for educational measurement are essentially different from those in more common use in that they are more arbitrary, less natural, and less fundamental.[1] Secondly, there is advanced the belief that age and quotient units are inadequate and undesirable because measurements in terms of mental and educational age are ordinal or positional, while measurements in terms of other units are additive.[2] In the third place, there is the definite assertion that units in terms of the standard deviation, the so-called "Standard Scores," are better units than any others, and especially that they are superior to the percentile and age scores so frequently used in educational measurement.[3] These three assumptions the writer wishes to examine critically, because it seems very important for the progress of educational measurement to determine their validity.

There seems to be a general idea, as noted above, that the units in which we measure length, weight, area, and volume, are natural, inevitable, unalterable in their essence, and unchanging in their meaning. This idea is probably not held by the leaders in the field of educational measurement, but it is commonly held by the critics of educational tests and scales. It is, of course, a mistaken notion. Practically every unit which we use in every-day life is entirely conventional, and each was arrived at only after a period of social experimentation, unconscious, no doubt, in the beginning, but growing more purposive as time went on, and resulting in the measures as we know them through kingly fiat, legislative enactment, or common consent of interested parties. Different countries and peoples have arrived at different conventions, and there is nothing natural, fundamental, or inevitable about any one of them.

[1] Klapper, Paul. "The Experimental Study of Education," *Journal of Educational Research*, XII (September, 1925), pp. 131-2.

[2] Dearborn, W. F., and Long, H. H. "On Comparing IQ's at Different Age Levels on the Same Scale," *Journal of Educational Research*, XVIII (November, 1928), pp. 265-274.

[3] Wilson, G. M. "The Standard Deviation Versus Age as a Score Unit," *Journal of Educational Research*, XIII (March, 1926), pp. 189-196.

Eventually, no doubt, those units will become universal which appear to be most sensible and convenient, but it is not inevitable that in the final selection of units a great amount of consideration will be given to naturalness.[4] In the meantime, it may be stated confidently that the only commonly employed units which are natural in any true sense of the word are time units, the day and the year. These are not fixed by man, but by the universe, or at least by that part of the universe which contains the earth and the sun. Thus measurements in terms of mental and educational age, which use the time unit, are expressed in a much more natural and fundamental way than are the ordinary measurements of any other type.

The assumption that a mental or subject age is different from a height or a weight because it is positional or ordinal is also open to question. Surely a height of five feet means a certain position on a linear scale, just as a mental age of five years represents a position on a time scale. The pertinent question, however, is in regard to how the position can be measured. When the scale is additive, the position can be measured in equal units from a definite, known zero point. The ordinal measurement, on the other hand, simply shows relative position, for the zero point is unknown or indefinite, and the relative magnitudes of distances between given points in a series cannot be determined. It is possible to argue, of course, that since time has no beginning, there is no zero point, and that therefore any measurement on the time scale must be ordinal. This is not true, however, where any specific individual is concerned, for there is a very definite beginning of his life which furnishes a zero point on the time scale for him, and this is all that is needed.

The linear scale and the time scale are, of course, alike at the upper end since both length and time go on into infinity. Length does not stop simply because our yardsticks and anthropometers have an upper as well as a lower terminal point. On this basis it might be argued that time will end on next December thirty-first because there will then be no more leaves on the calendar.

There remains the question of the equality of units. It is true, of course, that there is a slight error in calendar time units as compared with the exact astronomical units, but the difference is very small indeed,

[4] Scientists, of course, have gone much farther on the road to universality of units than the common people, and would go farther still if it were not for the fact that the common people in every country are loathe to give up their conventions.

amounting to only about one day in fifteen hundred. This is entirely negligible in measuring living organisms, and so the time scale is, from the practical point of view, exactly like the other scales in that its units are equal.

This equality of time units, however, is not a generally accepted fact. It is commonly believed and frequently stated that because the individual grows more physically in some years than he does in others, and because the mental tasks which are required in the intelligence tests are different for different ages, therefore the years on the time scale are unequal in value. If this argument is sound, however, it may be said that inches are not equal units, because in growing an inch a child sometimes lives only one month, sometimes as much as six months, and sometimes over a full year.[5] Similarily, the equality of pounds as units may be attacked, because in gaining a pound a boy sometimes lives through ninety days, and at other times he lives only twenty-four days. The same line of reasoning may be used with mental growth substituted for chronological. That is, since a boy develops mentally to a greater extent while growing some inches than he does while growing others, therefore the inches are not equal.

The above argument is specious whether applied to years or pounds or inches. Equality of units on any scale must be studied by reference to units of that scale itself, and not by reference to units of another sort. Inches are not equal units unless this requirement is observed. When this test is applied, the time scale has equal units, save for the slight error previously mentioned, in the same sense that any scale has equal units. Just as an inch is always an inch, so a year is always a year.

It may be pertinent to point out, in connection with this consideration of the equality of units, that from the practical point of view there is probably no such thing as equality. An inch is an inch only so long as it remains on the yardstick or the ruler; as soon as something is measured this equality disappears. An inch added to a man's stature is quite a different thing in value and meaning from an inch added to the end of his nose. Furthermore, the inch in stature has not always the same meaning. As already pointed out, it may represent only a month's growth in the days of infancy, while in late adolescence two years may be necessary to acquire it. Further still, an inch in stature means less

[5] These statements are based on average growth. The differences would undoubtedly be very much greater if individual growth were considered.

to the individual of average height than it does to the short man who without it will be noticeable as a runt, or to the tall man who will become over-conspicuous because he has it. This difficulty is present in measuring inanimate things as well as living organisms. An inch on a transatlantic cable is very different from an inch on the weight beam of a sensitive balance. A pound of granite is different from a pound of gold. Even time units do not avoid this difficulty; a year in college is different from a year in jail.

In short, the value and meaning of any unit vary widely at different times and under different conditions. Equality of units is a theoretical concept and it does not exist except on the scale itself. This theoretical equality is of little practical value when the scale is put to use as a measuring instrument. In fact, the equality concept may be absolutely harmful as it has been and still is in connection with the idea that each year's work in school should be the same for all children who are of approximately the same chronological age.

The assumption that the variability or sigma unit is always and inevitably a better unit than any of the other units is likewise open to question. First let us examine the case of the sigma versus the percentile standing. In the normal distribution there is a kind of reciprocal relationship between distances laid off along the base line and corresponding areas of the surface under the curve. One standard deviation laid off from the mean in either direction will subtend 34.13 percent of the area, and two sigmas will subtend 47.72 percent. Conversely, however, 34.13 percent of the area will always overlay one sigma, and 47.72 percent will always overlay two sigmas. It cannot be said that one of these statements is right and the other wrong. Both are true. A sigma score can always be translated into percentile score, and vice-versa.

The same difficulty appears in the comparison of sigma and percentile units which, as already noted, always appears when the attempt is made to evaluate the units of one scale in terms of another scale. It is true that percentile units are not alike in terms of the sigma units to which they correspond. It is equally true, however, that sigma units are unequal in terms of the corresponding percentile units. The first sigma above or below the mean includes 34.13 percent of the cases, but the second includes only 13.59 percent.

The assumed superiority of the sigma score over the age score rests on the same kind of faulty reasoning that is advanced in support of

other units against the time unit. That is, the sigma units are believed to be equal, while the time units are supposed to be unequal. The falsity of the latter assumption has already been demonstrated, and the sigma units have been shown to be unequal when measured by percentile units. The matter might be left at this point, but it is important to examine further the supposed equality of the sigmas.

Suppose that the standard deviation of a group of men taking Army Alpha is 42. Then the man whose position is plus one sigma is a man who made a score which is 42 points larger than the mean. These 42 points are no more equal in value among themselves than are the various items of the Stanford Binet scale, which inequality, according to the prevailing notion, precludes the possibility of equal mental year units. In every separate test of Alpha there is a wide range of difficulty in the items, and some are at least five or six times more difficult than others. Furthermore, it is only by chance that any two men chosen at random because they both stand at plus one sigma would surpass the mean by the same 42 points; and thus another element of inequality is introduced.

Again, consider the score of the man who stands at plus two sigma. He has, of course, a score which is 84 points above the mean. There is practically no chance at all that the second 42 points are equal to the 42 points made by the first man, because as the total possible score is approached it must be done by solving harder and harder items. This argument applies with still greater force as the size of the sigma position increases.

This analysis might be continued with other illustrations, but it has gone far enough to indicate that a standard deviation of a series of test scores is always made up of score points which are no more equal than the various items on the Stanford and other Binet scales. If the year units are unequal so are the sigma units. Of course, on the basis of the above analysis both units are unequal. It is, however, just because the original item scores are unequal that the translation into derived scores is made for the purpose of getting equal units. The point to be remembered is that there is no special magic operating in the case of the standard score. The age or time scale gives units which are just as equal to each other as are units in terms of the standard deviation. Each type of unit is equal to other units on the same scale.

Thus it appears that the handicap under which educational measurement is supposed to labor because of the nature of the units employed

in measuring is not nearly as great as it is thought to be. The time unit, which is used for all of our intelligence tests and for some of our best subject matter tests, is a much more natural and fundamental unit than any of the manufactured and conventionalized units for height, weight, area, and volume. Entirely natural and fundamental also are the standard deviation and percentile units, since these measures can always be calculated from any frequency distribution. From the point of view of naturalness, the units in which test results are expressed are far better units than inches, acres, pounds, or gallons.

Of the age, sigma, and percentile scores it cannot be said, on the basis of equality, that one is better than another. Each scale is made up of equal units with reference to the scale itself. In each case the units become unequal when the attempt is made to express or interpret them in terms of units of another scale. Each type of score tells a different fact, and no one of these is more or less right than any other.

Since on the basis of naturalness and equality there is no advantage inherent in any one unit, the choice of units for use in any particular instance must be made on other grounds. The utility of the unit for the purpose at hand is an important consideration. Often one unit is decidedly more useful than the others in handling certain data on particular problems. Meaning and interpretability are also very important, especially for the layman and ordinary teacher. For these groups, undoubtedly the percentile, age, and grade units are most valuable, and it is unwise to employ variability units for measuring instruments which are to be used by teachers. In any particular project there should be a careful consideration of all the factors involved, and that unit should be chosen which appears the best fitted in the light of all the circumstances. It should be held in mind that no one unit has any special combination of virtues through which it is always and inevitably superior to all the rest.

SHORTER ARTICLES

MINOR STUDIES ON OBJECTIVE EXAMINATION METHODS

IV. Sentence-Length as a Specific Determiner in True-False Statements

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WORD-LENGTH OF STATEMENTS

DEFINITIONS.—Word-length, as the term implies, is the number of words of which a statement is composed. Weidemann found that a "good" statement can ordinarily be constructed with a word-length of between 10 and 20 words.[1] "Degree of 'goodness' of a statement is the percent of correct response by the best one-fifth of the group of students minus the percent of correct response by the poorest one-fifth of the group of students."[2] Weidemann found also that little relationship exists between "goodness" and the word-length of a statement.

Purpose of the Study.—The purpose of this study is to determine whether any relationship exists between the word-length of statements and the truth or falsity of these statements.

Sources of Data.—The data for this study were derived from true-false statements included in 376 examinations entered by teachers in the nation-wide contest in the construction of objective examinations, conducted by Drs. G. M. Ruch and G. A. Rice. These 376 examinations which covered all the major fields of high-school studies, contained 10,756 true-false statements of which number 6671 were available for this study.[3]

Procedure.—Each statement was recorded as true or false as the case happened to be, likewise the number of words contained in that statement was tabulated. A frequency distribution table was constructed showing the grouping of the word-lengths of statements in step-intervals of five, the frequency of true and false statements in each group, the percentage of true and false statements, and the probable error of these percentages.

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[1] Weidemann, C. C. *How to Construct the True-False Examination.* Teachers College, Columbia University, Contributions to Education, No. 225. p. 76.

[2] *Ibid.*, p. 75.

[3] The writer is indebted to Drs. G. M. Ruch and G. A. Rice for permission to analyze these statements.

Results of the Statistical Analysis.—Table I displays the facts of this study.

TABLE I

DISTRIBUTION OF WORD-LENGTH OF 6671 TRUE-FALSE STATEMENTS

No. of Words in Statement	Frequency			Percent		P.E. of Percent
	True	False	Total	True	False	
1– 5	197	169	386	51.0	49.0	1.78
6–10	1056	1207	2263	46.7	53.3	0.96
11–15	1057	1067	2124	49.8	50.2	0.73
16–20	678	544	1222	55.5	44.5	1.44
21–25	327	189	496	65.9	34.1	0.22
26–30	72	26	98	73.5	26.5	3.00
31–35	47	10	57	82.5	17.5	3.39
36–40	13	2	15	86.7	13.3	5.80
41–45	6	0	6			
46–50	1	0	1			
51–55	2 (10)	0 (0)	2 (10)	100.0	0.0	0.0
56–60	0	0	0			
61–65	1	0	1			
Total	3457	3214	6671	51.8	48.2	0.41

From Table I it may be seen that:

1. Of the 6671 statements analyzed, 3457 or 51.8 percent were true statements and 3214 or 48.2 percent were false statements.

2. Of the 6671 statements, 4387 or 65.8 percent were composed of from 6 to 15 words. In other words, about two-thirds of all the statements were composed of 15 or less words.

3. Of 4773 statements containing from 3 to 15 words, 2310 or 48.3 percent were true statements and 2463 or 51.7 percent were false. That is, all statements composed of 15 words or less tend to be false as often as true.

4. Of 2188 statements of 21 to 40 words, 1437 or 65.7 percent were true and 751 or 34.3 percent were false.

5. Of 5995 statements composed of 3 to 20 words, 2988 or 49.8 percent were true and 3007 or 50.2 percent were false.

6. Of 666 statements composed of 21 to 40 words, 459 or 69.0 percent were true and 207 or 31.0 percent were false.

7. The length of the statements varied from 3 to 62 words.

CONCLUSIONS

1. A relationship exists between the word-length of a statement and the truth or falsity of that statement.

2. Short statements, that is, statements composed of 3 to 20 words are as often true as false.

3. Long statements, that is, those composed of 20 to 25 words tend to be true in about 66 percent of the cases, while those composed of more than 25 words tend to be true in about 80 percent of the cases.

4. A probable explanation of the tendency for long statements to be true is that teachers in attempting to construct true-false statements that may be defended as definitely either true or false, add dependent phrases and clauses. The evidence indicates that these dependent phrases and clauses tend to erase any possible falsity of the statement.

5. Should pupils become aware of the role of word-length in true-false tests, they might easily capitalize on these situations.

MUST ALL MEASURES OF SCHOOL WORK BE QUANTITATIVE?

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WHAT principles should govern the selection of materials for courses in educational measurement? One may regard educational measurement as an organized body of subject matter which should be presented systematically. Or, one may develop the course in terms of the need of the individual who pursues the course. Thus, the course may be designed to serve the class-room teacher or the research worker. It appears that textbooks and courses in measurement fail to discriminate properly between the needs of these two types of services.[1] The research worker must test his assumptions which concern the amount and character of data required, the number and kind of sources to be investigated, and the techniques of collecting data from the sources. Quantitative data, objectively secured, offer the most reliable check and have become the *sine qua non* of research effort. These rigid requirements remove many pressing problems from the research field. Problems are selected less by virtue of their importance than of the fact that they yield to research methods. The problems of the teacher, however, are urgent. She cannot defer the solution pending the development and application of techniques adequate for the research problem. She must employ whatever techniques are at hand. This paper undertakes to demonstrate the desirability and practicability of including other than purely quantitative measures in courses in measurement for teachers in training. The problem confronting the instructors of courses in educational measurement for classroom teachers is to organize a course that

[1] Waples, Douglas. *Investigations in Teaching.* (Chicago: University of Chicago Bookstore), Chap. I.

will acquaint teachers with simple and effective means of evaluating the attainment of all important objectives in teaching.

In attacking this problem, the writer has made several assumptions: first, that pupils' attainments in *all* the desired outcomes of instruction should be measured or described; second, that the statement of objectives prepared by the Committee of the North Central Association[2] is adequate; third that the Commonwealth list of activities performed by pupils in learning[3] is a complete list of the activities useful in achieving the desired outcomes.

The first step in the demonstration has been to prepare a cross-check table for each of the four general aims of the N. C. A. list with the 37 pupil activities of the Commonwealth list. Table I illustrates a portion of the cross-check table for the 25 social objectives and the 37 pupil activities. The objectives, as given by the N. C. A. Committee, have been restated in some instances to economize space on the original chart. The table is read as follows: The general aim A, "Acquiring fruitful knowledge" is furthered by the pupil activities numbered 1 ("Developing interests, motives, and appreciations"; 3 ("Participating in class activities"); 5 ("Developing individual tendencies and abilities"), etc. In rendering these judgments, the writer has assumed that the pupil activities have functioned under optimum conditions. An examination of the four completed tables made it evident that some of the 37 pupil activities (under optimum conditions) contribute effectively to the attainment of each objective. Thus, it may be assumed that we can measure the success of pupils in achieving the desired outcomes insofar as we can measure the success of pupils in performing the activities which contribute to each objective.

The second step was to determine the applicability of various techniques for measuring and describing the success of pupils in performing the activities. This involved, first, the collection of available techniques. The writer has selected these from the list of techniques for collecting data reported by Waples.[4] This list was secured by an analysis of representative studies. Using eight of the techniques cited by Waples, the writer prepared a cross-check table with the 37 pupil activities. The result is shown in Table II. This table is read as follows: The degree

[2] *The North Central Association Quarterly*, March, 1927.

[3] Charters, W. W., and Waples, Douglas. The Commonwealth Teacher Training Study (Chicago: University of Chicago Press, 1929), Section II-b. p. 55.

[4] Charters and Waples. *op. cit.*, p. 55.

of success of pupils in performing the activity I ("Developing interests, motives, and appreciations") may be determined by techniques 1 ("Observation"); 2 ("Personal Interview"); 3 ("Group Conference"); 4 ("Diary"); 5 ("Question Blank"); 6 ("Check List"); and 7 ("Rating Scale"). Technique 8 ("Standardized, objective tests"), however, does not apply adequately in this case. An examination of this table shows that the technique of observation is applicable to all the 37 activities. Personal interview, group conference, check list, and rating scale likewise appear to be applicable generally. Standardized objective tests on the contrary, cover only 19 of the 37 pupil activities.

The significance of the relative applicability of the objective measure is strengthened by an examination of the importance of certain pupil activities which such tests do not cover. The 37 activities have been rated for importance by various representative groups. The writer secured from the data of the Commonwealth Study the combined rating of the 37 activities by the following groups: University of Chicago graduates who are high-school teachers; supervisors of practice teaching in high-school grades; college instructors of secondary education; intermediate grade teachers; city supervisors of elementary grades; and supervisors of practice teaching for elementary grades. The ratings as published in the study are statistically reliable. Among the activities which were rated high and which were not covered by objective tests, we may note the following:

Number of Activity	Rank of Importance
1	1
2	1
8	10
9	8
11	12
14	4
21	14

These seven activities are above the average in importance, including two in the highest rank. At present, objective tests make hardly a pretense of investigating in the field of motives, interests, attitudes, and traits; yet, we send out teachers to direct pupils how to reach these goals. It appears imperative that we equip the teacher with the supplementary techniques which may enable her to estimate progress toward them.

The adoption of the supplementary techniques must be governed by the criteria for the selection of any measuring device, namely, reliability,

practicability, and validity.[5] These criteria imply that if the additional techniques are to be used, teachers in training must be trained in their use. Recent contributions point to an increase in the use of such supplementary techniques in the near future. Symonds[6] has included an excellent treatment of the rating scale in his recent text. Charters and Whiteley[7] have illustrated the technique of the interview. Buswell and John[8]

TABLE I

SECTION OF CROSS CHECK TABLE FOR THE SOCIAL OBJECTIVES AND THE PUPIL ACTIVITIES IN REACHING THE OBJECTIVES

THE SOCIAL OBJECTIVE	PUPIL ACTIVITIES IN ATTAINING OBJECTIVES					
	1. Developing interests, motives, and appreciations	2. Developing traits and habits	3. Participating in class activities	4. Establishing friendly relations with other pupils	5. Developing individual tendencies and abilities	6. (In similar manner the 37 pupil activities of the Commonwealth list are listed on the original cross check table.)
A. Acquiring fruitful knowledge	√		√		√	
1. Knowledge preparatory to acquiring other knowledge	√		√		√	
a. Acquaintance with events, persons, movements, customs, and institutions which have determined the progress of mankind	√		√		√	
b. Familarity with the sources of social facts and phenomena	√		√		√	
c. Knowledge of methods of using historical and other general reference material	√		√		√	
d. Knowledge of the social implications of the subject matter	√		√		√	
2. (The several heads and subheads of the N.C.A. list are continued on the original cross check table.)						

[5] Waples, Douglas. *op. cit.*, p. 53.

[6] Symonds, P. M. *Measurement in Secondary Education* (New York: Macmillan, 1928), Chapter XVI.

[7] Charters, W. W., and Whitley, Isadore B. *Analysis of Secretarial Duties and Traits*, Baltimore: Williams and Wilkins, 1925.

[8] Buswell, G. T., and John, Lenora. *Diagnostic Studies in Arithmetic*, S. E. M., No. 30, Dept. of Educ., University of Chicago.

TABLE II

CROSS CHECK TABLE FOR EXHIBITING THE APPLICABILITY OF EIGHT TECHNIQUES FOR COLLECTING DATA TO THE 37 PUPIL ACTIVITIES OF THE COMMOMWEALTH FUND STUDY LIST

PUPIL ACTIVITIES IN REACHING OBJECTIVES	Techniques for determining the degree of success of pupils in performing the list of activities which contribute to the attainment of the objectives of education							
	1. Observation	2. Personal interview	3. Group Conference	4. Diary	5. Question Blank (Questionnaire and self-analysis)	6. Check-list	7. Rating Scale	8. Standardized objective tests
1. Developing interest, motives, appreciations	√	√	√	√		√	√	
2. Developing traits and habits	√	√	√		√	√	√	√
3. Participating in class activities	√	√	√			√	√	
4. Establishing friendly relations with other pupils	√	√	√			√	√	
5. Developing individual tendencies and abilities	√	√	√	√		√	√	
6. Solving problems	√	√	√			√	√	
7. Improving skills and abilities	√	√	√			√	√	√
8. Making practical use of materials studied	√	√	√	√	√	√	√	√
9. Making economical use of time	√	√	√			√	√	
10. Meeting formal requirements	√	√	√			√	√	
11. Deciding what is to be done	√	√	√	√		√	√	
12. Checking teacher's directions for clearness	√	√	√			√	√	
13. Forseeing results to be obtained	√	√	√			√	√	√
14. Planning methods of work	√	√	√			√	√	
15. Gathering reading materials	√	√	√			√	√	
16. Finding desired information from reading materials	√	√	√			√	√	
17. Obtaining information from sources other than reading	√	√	√			√	√	
18. Recalling useful information obtained from reading and experience	√	√	√			√	√	
19. Collecting necessary supplies and equipment	√	√	√			√	√	
20. Obtaining perspective of course	√	√	√			√	√	√
21. Maintaining critical attitude toward materials studied	√	√	√			√	√	√
22. Preparing for class work	√	√	√	√		√	√	√
23. Locating specific problems	√	√	√		√	√	√	√
24. Analyzing problems	√	√	√			√	√	√
25. Organizing material in proper form	√	√	√			√	√	√
26. Summarizing material	√	√	√			√	√	√
27. Memorizing materials	√	√	√			√	√	√
28. Combining material in proper relationships	√	√	√			√	√	√
29. Discussing implications of material studied	√	√	√			√	√	√
30. Finding of making illustrations for greater clearness	√	√	√			√	√	√
31. Noting, outlining, recording information	√	√				√	√	√
32. Carrying on class routines	√	√		√	√	√	√	
33. Obtaining criticism from teacher and other pupils	√	√	√			√	√	
34. Obtaining help from teacher and other pupils	√	√	√			√	√	
35. Taking tests and examinations efficiently	√	√	√			√	√	√
36. Comparing work with standards to check errors	√	√	√			√	√	
37. Correcting errors	√	√	√			√	√	

have presented a type of controlled observation which offers the teacher an effective insight into pupil's difficulties in performing the fundamental operations with integers. These studies suggest the rich returns which may result from the refinement and use of the supplementary techniques. The writer believes that the widely scattered bits of experience in the use of the supplementary techniques should be brought together and evaluated. Refined procedures in their use should be formulated. Syllabi embodying such procedures should be prepared for courses in educational measurement. In addition to the anticipated increase in the adequacy of the means of measurement, there should be the further happy result that teachers would be encouraged to study the progress of pupils directly, rather than chiefly through the dead records of test blanks.

AN EXPERIMENT TO TEST THE INCREASE IN REASONING ABILITY FROM THE USE OF TEST AND PRACTICE SHEETS IN 6A ARITHMETIC

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WITH the influx of practice and test sheets, and pads of various descriptions, has come a flood of such material for use in arithmetic classes. One naturally asks the question, "Of what value is it?" With this in mind, an experiment was planned to test the increase in reasoning ability from the use of such material as is found in the *Lennes Test and Practice Sheets in Arithmetic*. Book Six, second half, was chosen for use in grade 6A.

PLAN OF THE EXPERIMENT

Two groups of 6A pupils were chosen from each of the two schools represented in the experiment, one to serve as an experimental class and the other as a control group. The classes were selected on the basis of the scores in Otis Arithmetic Reasoning Test, Form A, in order to make them equivalent in median arithmetic reasoning ability. The scores from the National Intelligence Test, Scale A, Form 1, were used to pair each individual in the experimental group with another in the control group.

After the pairing, the medians were computed and exchanges within the pairs made to give groups of more nearly equivalent intelligence. At the close of the experiment, any individual within either group whose corresponding member in the other group had withdrawn from school

was dropped from the records. This done, the initial median ages were: chronological ages, 139.5 months for each group; arithmetic reasoning ages, 139.6 months for each group; and mental ages, 147.0 months for the control group, and 150.3 months for the experimental group. This difference in mental ages is largely due to the withdrawals. The data are based on eighteen pupils in each group.

The work was started February 21 and ended after 58 days, May 28. The control group was taught from a standard text with very little attention given to diagnosis except that generally provided in an arithmetic text. The experimental group used the Lennes text and practice sheets in accordance with the author's directions. At the close of the experiment, the Otis Arithmetic Reasoning Test, Form A, was given to check the gain in reasoning ability.

TABLE I

RELATIVE ABILITIES OF EACH GROUP

Measures of Ability	Otis Arithmetic Scores				N.I.T. Scores	
	Control Group (18 pupils)		Experimental Group (18 pupils)		Control Group	Experimental Group
	Initial	Final	Initial	Final		
Mean	7.4	8.0	7.3	9.7	106.6	109.7
P.E. of the mean	.36	.40	.42	.24	3.4	3.1
Median	7.2	8.5	7.2	9.9	106.0	109.3
P.E. of the median	.45	.50	.52	.30	3.8	3.2
Standard Deviation (σ)	2.24	2.51	2.64	1.52	22.6	19.2
P.E. of (σ)	.32	.42	.44	.25	3.8	3.2
Difference of means	.10	1.7	.10	1.7	3.1	3.1
P.E. of difference	.55	.47	.55	.47	4.6	4.6
Difference of medians	.00	1.4	.00	1.4	3.3	3.3
P.E. of difference	.69	.58	.69	.58	4.9	4.9

TABLE II

QUOTIENTS OF VARIOUS LEVELS OF BOTH GROUPS

	Control Group (18 pupils)		Experimental Group (18 pupils)	
	Initial	Final	Initial	Final
Intelligence Quotients				
Upper Half		116		121
Lower Half		97		98
Whole Class		107		109
Arithmetic Quotients				
Upper Half	111	108	108	116
Lower Half	93	98	94	108
Whole Class	102	103	100	112
Arithmetic Accomplishment Quotients				
Upper Half	94	93	87	96
Lower Half	96	101	98	110
Whole Class	95	97	93	103

RELIABILITY OF EXPERIMENT

Before giving an interpretation of the data, it must be borne in mind that the conclusions apply only to identical conditions. The formulae, especially the reliability formula used, do not allow for faulty technique, experimental bias, or other limiting factors not ruled out. They merely take recognition of errors that arise from sampling and not of practice effect, fatigue, or errors from giving or scoring the tests.

A difference of the median scores of 1.4 ± .58 (Table I) at the close of the experiment indicates a difference of 2.4 P.E., which may be interpreted to mean that in 95 chances out of 100 the experimental group will exceed the control group. On the basis of months of reasoning age as determined by Otis Arithmetic Reasoning Test, Form A, the control group gained four months and the experimental group gained 19.2 months. This may seem like an extraordinary gain to secure within three months, but the competition element could not be fully controlled where both classes met and recited in the same room. The experimental group was also favored by using a new and interesting type of material.

GAINS IN EFFICIENCY

In order to fairly interpret the data and eliminate the effect of differences in arithmetic and mental capacity, the increases were further measured in terms of the arithmetic quotient and the accomplishment quotient. Reference to Table II shows that the control group made very little gain as measured by initial and final arithmetic quotients. The experimental group made a mean gain of twelve percent.

On the basis of the division into upper and lower halves of the classes, the control group gained in the lower but lost in the upper levels. The experimental class gained 7.5 percent and 14.9 percent for the upper and lower levels respectively. Approximately the same results were secured from the comparison of the arithmetic accomplishment quotients.

A further study was made in one of the schools to determine the amount of time spent by the pupils in arithmetic study. Records kept by the pupils themselves showed a daily average of 40.6 minutes for the control group and 39.4 minutes for the experimental group. In computing this data, perfect attendance was assumed, inasmuch as each pupil was required to work the lessons which he missed. From the teacher's records kept each alternate week beginning with the second week, it was found that less time was needed in presenting and checking

the work of the experimental group. The average daily amount of time spent with the control group was 15 minutes and with the experimental group, 12.8 minutes.

CONCLUSIONS

The results of this experiment indicate that:

The use of carefully prepared test and practice sheets similar to the ones used may be expected:

(1) to increase the reasoning ability of the class;

(2) to increase the reasoning efficiency of the class in relation to both chronological age and mental age; and

(3) to allow for individual differences in ability.

SAMPLING OF READING MATTER

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SINCE the method of sampling is a common one in dealing with all types of data, it has naturally been applied to the study of reading matter, especially in the endeavor to determine what proportion of difficult words a book might contain.[1] It was in studying some reading books with this purpose in view that the writer encountered a characteristic of such data that has not been taken into consideration by previous investigators but which cannot be overlooked if sound results are desired.

To illustrate, let us assume a simple case in which a book is to be sampled by taking all the even pages for the purpose of finding out the total number of different words it contains. Such a sample would give us approximately half the running words in the book. The usual procedure would be to check over these even pages, record each word once when it first appears, and thus get a number of different words. Since this is the number for half the book, the natural thing to do would be to multiply by two to get the number for the whole book. In fact, however, any figure thus secured will be very much too high. This may easily be explained as follows:

[1] Some studies using sampling of reading matter are: Lively, Bertha, and Pressey, S. L. "A Method of Measuring the Vocabulary Burden of Textbooks, *Educational Administration and Supervision*, IX (October 1923), 389-98. Mathews, C. O. *Grade Placement of Curriculum Materials in the Social Studies*, Teacher's College, Columbia University, Contributions to Education No. 241. Vogel, Mabel, and Washburne, Carleton. "An Objective Method of Determining Grade Placement of Children's Reading Material," *Elementary School Journal*, XXVIII (January 1928), 373-81.

In the illustration just given, our counting of different words in the even pages would give us a list of all the words *first appearing* on those pages. There would perhaps be an equal number first appearing on the odd pages that we did not count. The difficulty will be, however, that the words first appearing on the odd pages would in very many instances *appear again* on the even pages. In our count we would have no way of knowing that they had appeared before and they would, therefore, be counted as first appearances. We would thus get in our list for the even pages both first and second appearances combined. By multiplying by two, we would then get much too high a figure for the whole book, since many of the words would thus be counted twice. This difficulty comes up no matter what fraction of the book is tabulated. We will always get a list of words first appearing in the part studied and also repetitions of words that first appeared in the part of the book not studied. Therefore the statistics for a part cannot fairly represent the whole.

There is the added difficulty that we cannot, by a uniform method of sampling or by statistical adjustment, make a sampling represent the whole. This is due to the fact that the words in some books are repeated much more than in others. Repetition of words, especially of hard words, is one of the important ways of lessening difficulty. When unfamiliar words are used, they should be repeated as often as possible. Yet the greater repetition there is, the more a sample is padded, and the higher percentage of difficult words any sampling will show. Since reading matter varies greatly in the amount of repetition of hard words, even a uniform method of sampling will get figures that are not comparable with one another. And for the same reason, no uniform system of adjustment can be made to cause the samplings to fairly represent the different books or selections.

An illustration of the unrepresentative character of a sampling is shown in the following table derived in a study recently made. In some reading books the difficult words, as determined by a certain criterion, were being counted and compared to the total words in the book. Thus a percentage was secured which served as an index of difficulty. This could be simply interpreted as so many hard words per hundred running words. For the sake of thoroughness we tabulated the entire book. Wondering whether we could not save ourselves labor, we added up the figures for a sample of every tenth page. The resulting index did not agree with that for the whole book. Repeating the process with other

samplings we obtained the figures shown, which are consistently much larger than the true ones, which the study of the whole had given us.

TABLE I

COMPARISON OF SCHOOL READERS AND SAMPLINGS FROM THEM AS TO PERCENTAGES OF DIFFICULT WORDS

(Difficult words are considered to be those assigned by certain criteria to the same grade as the book or to higher grades. The percentage is difficult words divided by running words.)

	Whole Book	Different Samplings*		
		No. 1	No. 2	No. 3
Book II	1.1	2.0	1.5	2.0
Book III	2.6	4.0	3.5	3.5
Book IV	2.6	4.2	4.3	4.5

* Samplings were made by taking every tenth page, but beginning at different pages.

The difficulty here pointed out is directly traceable to the situation that in the vocabulary of reading matter, new items are constantly appearing and old items are constantly being repeated. If the repetition were in any way uniform, allowance could be made for it, but such is not the case. These facts cause us to question the extent to which any vocabulary data based upon a sampling is representative of the whole unit of reading matter.

THE COMPARATIVE VALUE OF EXTRA-CLASSROOM STUDY IN THE LEARNING OF EDUCATIONAL PSYCHOLOGY

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THERE is a growing tendency to eliminate waste in education. As schools assume greater responsibility for the development of the individual, it becomes increasingly important that maximum results be obtained with a minimum expenditure of time and effort. At present a movement towards economy of time and effort in production is prevalent in the industrial and commercial fields. The working day is constantly growing shorter, and this idea is tending to be carried over into the educational field. School men are beginning to question the amount of time that can be spent profitably in study activity and are encouraging investigations to determine the relative effectiveness of the various study practices which are now extant. W. H. Heck calls attention to the fact that "a scientific study of the whole question is made urgent by the present confusion arising from (1) the home study requirements of most American and European schools above the primary division; (2) criticisms of many hygienists, psychologists, and administrators as to the

quantity or quality of home study; and (3) the recent abolition of home study requirements in a growing but still small number of American schools, generally with some increase, redistribution, or modified use of the study time in school."[1]

This present study attacks the problem from the point of view of the value of having students carry on all their study activity during the regular class period as compared with the traditional method of assigning certain material to be mastered outside the regular class period. In order to give the results more than local significance, the investigation was conducted at two teacher training institutions: State Teachers College, Fredericksburg, Virginia; and The Maxwell Training School for Teachers, Brooklyn, New York. The subjects of the experiments were 155 students of Educational Psychology: in Virginia, 61 entering freshmen; in New York, 94 second semester students who had successfully completed a course in general psychology. All students were given the Terman test of Mental Ability and were accordingly equated in terms of the results. The New York students were divided into three sections having mean averages of 154, 156, and 161 respectively. The averages of the two Virginia groups were 141 and 143 respectively. Since the experiments, however, were so conducted that the comparison of the behavior of group against group was checked by a similar comparison of group against itself, the relative intelligence ratings of the individuals have relatively little importance.

The investigation was divided into two parts: Experiment A and Experiment B, each covering a period of six weeks of study, or twenty-four one-hour recitations. Standard textbooks of educational psychology were used, and in each institution a single member of the psychology department was responsible for the conduct of the entire investigation. At the beginning of the investigation each student pledged himself to abide by all the conditions of the experiment. During the first six weeks (Experiment A) one of the Virginia groups and two of the New York groups had their class periods conducted according to traditional methods of discussion of topics based on regularly assigned extra-class study. At the same time the other Virginia group and the third New York group confined all their study activity to topics presented in the regular class period with no extra-study or outside preparation. It must be understood that all the classes in the two institutions, respectively, were basing their discussions on the same topics and that the same suggestive ques-

[1] *Elementary School Journal*, October, 1926, page 118.

tions were used throughout; the only difference in the procedure was that with the one group books were used for study purposes outside the regular class periods and were not referred to in class, while with the other group books were used in class during the discussion and there only. During the next six weeks (Experiment B) the procedure of the groups was reversed. The groups which had had the extra-class study now became the class study groups and did no study outside their regular recitation period, while the class study group of Experiment A now became the extra-class study group and did their actual book preparation outside regular class periods.

TABLE I

THE ARRANGEMENT AND SIZE OF GROUPS

	Virginia		New York		
	Extra-study 25	Class study 36	Extra-study 32	Extra-study 28	Class study 34
Experiment A					
	Class study 25	Extra-study 36	Class study 32	Class study 28	Extra-study 34
Experiment B					

Although it is generally conceded that probably the only adequate test of an individual's understanding of educational psychology would be his behavior when he is placed in an actual classroom situation, the investigator, realizing the impracticability of this form of testing, was forced to use the traditional form of examination. He endeavored, however, to keep his testing program as objective as possible by limiting the tests to 250 short form questions each having a definite answer, the whole test totaling 300 points.

At the beginning of each experiment a preliminary test based on the work to be covered during the following six weeks of study was given to all groups in order to obtain a basis of the knowledge already possessed by the students. At the end of each experiment this test material was again given to the students for the purpose of testing their immediate recall of the subject matter learned. Four weeks after the close of each experiment the test was given for the third time so that possible loss resulting from the delay in recall might be discovered. In addition, weekly tests were used as teaching devices for organization of material and as check-ups on the smaller units of work. At no time during the investigation were the students informed of their ratings in the Preliminary, Final, or Delayed Recall tests.

The principal findings of the experiments may be summarized as follows:

(1) The distribution and the mean of the tests in every instance show that, while the students began with some basic knowledge of the material to be taught, the New York group, due probably to the fact that the students had completed one course in psychology, possessed at the start more preliminary information than did the Virginia students.

(2) The final and the delayed recall test results show gain in every case over the results of the preliminary tests; nevertheless, the delayed recall results were consistently lower than the final results.

(3) The groups were not uniform in the amount of knowledge which they gained. In every case the groups having extra class study gained more, relatively, than did the groups which confined their study to the regular class periods. This fact holds whether we compare group against group in the same experiment, or group against itself in the two experiments.

(4) The delayed recall results of the extra-class study groups were relatively lower than were the results of the groups which confined their study to the classroom. In other words, the latter groups retained more of what they had learned. This indicates that the advantage of the class study groups becomes greater as the process of forgetting sets in.

These results apply specifically to the learning of mature students; therefore, generalizations cannot be drawn concerning the possible study behavior of students of the elementary and secondary schools.

EDITORIALS

THE SCIENTIFIC STUDY OF CLASSROOM SUPERVISION

THERE is no aspect of the school program that is in greater need of scientific study than the program for the supervision of instruction. The objectives are poorly defined, the data gathering devices highly subjective, and the improvement program largely a matter of personal choice. The program is an important one affecting approximately a million teachers and twenty-five million pupils.

(1) There is need, in the first place, for a scientific conception of the program as a whole. The universal rule of science is to measure, to modify the situation in some significant respect (under controlled conditions), and then to measure the results; and to continue to do so until the desired goal is attained. In some instances, the desired goal is control over some particular situation; in others, it is the discovery of guiding facts, principles, and procedures. This rule is equally applicable to the supervision of instruction: Supervision needs, first, to discover the initial status of the teaching situation under consideration. A comparison of the initial status of the situation under consideration with accepted standards of efficiency will reveal the specific deficiencies that are in need of improvement. These constitute the immediate objectives of the improvement program. Having determined the aspects of the situation in need of improvement, the supervisor will search, next, for the probable causes of the shortcomings observed. In doing this he will employ the technique of causal investigations. Having determined the aspects of instruction in need of improvement and the probable causes of the shortcomings observed, he will then modify the situation in some significant respects and note the result. If the supervisor's primary interest is in scientific accuracy, he will modify the situation in a single significant respect at a time, with all other factors constant, and then measure the results. The general effectiveness of classroom supervision could be greatly improved if supervisors followed this simple pattern of science.

(2) The data gathering devices used in supervision need to be validated. These devices consist of tests, rating scales, instrumental

measurements, general observation, questionnaires, and conferences. Scientific workers in the conduct of research have come to require that the tests used by them be valid, reliable, and objective. These criteria need to be applied to all data gathering devices. This principle has been particularly violated by the observational techniques employed by the conventional supervisor and by the objective techniques employed by the so-called scientific supervisors. The conventional supervisor errs in that he fails to recognize that the informal items employed by him in the observation of teaching are personal in character and without validity, that they are highly subjective, and that they are unreliable. Supervisors employing objective techniques frequently fail to establish the validity and reliability of the data gathering devices employed by them. A time study of the teacher-pupil activities of the classroom may produce, for example, a considerable quantity of objective data interesting enough in themselves but practically worthless because of the supervisor's inability to place any valid interpretation upon them. Many supervisors bridge this gap by placing their own interpretations upon the data collected. We thus have objective data subjectively evaluated, which is about as far removed from the ideals of science as the practices of the conventional supervisor. The supervision of instruction could be greatly improved if supervisors applied the tests of validity, reliability, and objectivity to all data gathering devices.

(3) That aspect of supervision which pertains to the training of teachers in service is primarily a matter of teaching teachers how to teach. If supervisors are to effectively direct the process of learning to teach, they need, first, to know how teachers learn to teach. They need to know which aspects of teaching are easiest and which are hardest to learn, which are learned first and which last, and the special difficulties involved in mastering each; they need to know the rate at which teachers learn to teach, the number of items of training to which they can simultaneously attend, and the most effective sequences and organizations of training activities; and they need to know the amount of spread of training secured from different modes of training, the relationship to wholes and parts in training programs, and the responses of individuals of varying capacities. In the teaching of pupils a special point has been made of the necessity of knowing the mental processes involved in the different types of learning. Learning to teach involves the acquisition of definite knowledges, attitudes, and skills. If supervisors are to be most intelligent in the directing of teachers in their efforts to learn how to

teach, they should know the mental processes involved in the different types of learning to teach. Little is known at present about this sort of psychology.

(4) More information is needed about the relative effectiveness of different training programs. At present the programs employed in supervision are, for the most part, the personal choices of those employing them. Supervision needs: (a) some definite information about the relative effectiveness of different supervisory devices, such as bulletins, teachers' meetings, conferences, etc.; (b) more information about the effectiveness of specific procedures in specific situations, such as programs of providing for individual differences coöperatively arrived at through a series of tests, observations and conferences jointly executed by teacher and supervisor, programs of redirected instruction arrived at through an analysis of the teacher's objectives as revealed by her methods of classroom instruction, or programs of group activity based upon an analysis of the elements involved in direction; and (c) a body of facts, principles, and laws for the guidance of supervisors in teaching teachers, such as, distributed practice is more effective than concentrated practice, the range of human attention is limited, and that automatized activities require less attention than non-automatized activities. Many of these principles can be derived from the general field of learning. There is available at present, however, little direct experimental evidence bearing upon these aspects of the training of teachers.

(5) There is need, finally, for objective means of measuring the results of supervision. Measures of the changes produced in pupils, where there are a number of instances, where the tests employed are adequate, and where the extraneous factors are controlled, furnish the ultimate measure of the effectiveness of the supervision provided. The ultimate progress of the pupil is determined, however, by the pupil himself (and his previous experience and capacities), the teacher, the teacher's objective, the subject matter, the teaching, the learning, the materials of learning, the school organization, and the various physical factors conditioning the effectiveness of learning. In the case of certain of these factors, as, for example, in the rating and measurement of teaching ability, considerable progress has been made in the development of means of evaluating the level of operation observed; in others, little or no progress has been made. Supervision needs, not only instruments for measuring the ultimate products of instruction, but instruments for evaluating the levels of efficiency exhibited in its immediate antecedents.

In brief, supervision to-day, effective as it is, is largely the outgrowth of tradition and the personal experiences of those engaged in it. Its objectives are poorly defined, its data gathering devices frequently subjective, unreliable, and invalid, and its methods largely without the foundations of science. Research is needed in all of these respects. The progress of this program should be facilitated if supervisors follow the simple test, teach, test, pattern of science.

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REVIEWS

Address all communications relative to book reviews to Editor E. J. Ashbaugh, Miami University, Oxford, Ohio.

WAPLES, DOUGLAS, AND STONE, CHARLES A. *The Teaching Unit, A Type Study* (New York: D. Appleton and Company, 1929), x + 205 pp.

This volume attempts to outline and illustrate a workable procedure for selecting the best teaching methods to employ when learning is organized on a unit basis. Four steps of procedure are presented as being essential for discovering and collecting methods of teaching a given unit. Each step was made the basis of a project in teaching method.

The first step consisted in selecting "a single unit for investigation which has demonstrable social value" (p. 194). The unit of positive and negative numbers was chosen because it represents "a clearly defined unit" and "a legitimate teaching operation" (p. 189). As evidence of the established educational worth of the unit selected, the authors cite the judgments of contemporary specialists in the field of mathematics and the results of investigations that, in the main, represent little more than the pooling of opinions (pp. 145-48). In fairness to the authors it should be said that they call attention to the serious limitations of the method of consulting professional sources for the determination of curriculum content. "It is highly desirable to consult sources completely independent of the school, both for materials to compose the course of study and for effective methods of presenting the materials" (p. 145).

The second step consisted in analysis of the unit to determine desired outcomes of instruction. After the outcomes were determined by consulting school textbooks and previous studies containing lists of major items in the units, and by observing the recording pupils' classroom activities, an attempt was made to validate the outcomes by submitting them to a selected list of authorities on the teaching of junior high-school mathematics. Here again, it will be noted that the authors take refuge in professional opinion. That they realize the weakness of this method of discovering outcomes of instruction is made manifest when they stress the need of "insurance against the vicious circle formed by exclusive attention to professional sources in seeking to define efficient methods of teaching a given unit" (pp. 192-93).

Identifying learning difficulties comprised the third step of procedure. Four types of difficulties were discovered. These were, (a) difficulties in computation, (b) difficulties in understanding applying principles, (c) difficulties due to unfamiliar terms, and (d) difficulties due to personal and mental traits. After the type difficulties were identified, further analysis was made of the specific difficulties classified under the major types. This seems to be the most valid of the four steps of procedure because direct analysis was made of pupils' learning activities. Each of the major types of

difficulties is well treated in separate chapters devoted to the purpose.

The final step consisted in collecting teaching methods for removing the learning difficulties. A number of pertinent solutions are offered for overcoming the various difficulties. The reviewer has the feeling, however, that the procedures for removing the difficulties represent more a collection than a validated list. This conviction is based on the following statement: "The procedures were obtained from professional literature, from a few selected authorities by means of recorded interviews, and in some cases by informal classroom experiment" (p. 143). To the credit of the authors it should be said that they point out the limitations of their method of collecting teaching procedures and emphasize the desirability of "selecting effective methods of explanation and application from extra professional sources; that is, from persons who have nothing whatever to do with school teaching and who are engaged in occupations that have developed and standardized highly efficient solutions for the given difficulties" (p. 193).

This volume is worthy of the studious attention of any teacher or supervisor who has turned away from lesson-hearing and is casting about for ways and means of mastery teaching.

Miami University WALTER S. GUILER

WEEKS, BLANCHE E. *The Influence of Meaning on Children's Choices of Poetry* (New York: Teachers College, Columbia University, 1929), 50 pp.

The opinions of a number of people who seem to be well qualified to speak on the subject, support the following points: first, that the reading of poetry presents greater difficulties to children than the reading of prose; second, that these difficulties tend to obscure meaning and to interfere with the enjoyment of poetry; and third, that the child's experience should be such as will enable him to interpret the meaning of the poem as a whole as well as its symbolism. These considerations have, in general, "been more honored in the breach than in the observance." Undoubtedly it is because of this fact that they challenged Miss Weeks to test, (1) the extent to which figures of speech and involved sentence structure obscure meaning and thereby influence children's choices of poetry, and (2) the extent to which actual experience as a factor of meaning influences children's choices of poetry.

In securing objective evidence on these problems tests were given to a random sampling of 412 of the sixth grade population arranged in equated groups, chosen from three large cities and from six small communities whose environmental conditions afforded considerable latitude in the way of contrasted experience as a background for the understanding and appreciation of specific poems. The selection of the test material was based upon a preliminary study of prevailing practice in the selection of poetry for the intermediate grades. Included in the report of this study are chapters describing the tests, the methods of procedure, and the statistical techniques employed.

As a result of this study the following conclusions are those which the investigator considered the most significant:

1. In the reading of poetry both figurative language and involved sentence structure tend to obscure meaning but the former is the more serious reading difficulty.

2. Figurative language and involved sentence structure are factors influencing children's choices of poetry, and an un-

derstanding of what is read is a factor most favorable to choice.

3. Children's choices of poetry may be based on an inaccurate interpretation of the poet's meaning, and such interpretations result more frequently from literal interpretation of figures of speech than from inability to cope with involved sentence structure.

4. It seems fair to say that actual experience is a factor in the choices of poetry but such experience may be either favorable or unfavorable to choice.

5. Experience, direct or indirect, has an influence on choices of poetry, the tendency being to select that which embodies a known experience.

This investigation is reported in a lucid and concise manner. It is, moreover, constructive and concludes with a number of practical applications based upon the findings. These in a general way indicate means by which the teaching of poetry in the intermediate grades may be improved. This thesis will be read with satisfaction by those who have recognized the different types of difficulties that confront children in the reading of poetry for it will confirm their experiences and judgments, and at the same time suggest, in a broad way, procedures by which children may "under guidance, but of themselves, learn to see the beauty that the poet has created, and learn how to find enjoyment in that beauty." Those responsible for the selection of poetry for the intermediate grades will also find this study valuable.

Ohio State University AMY BRONSKY

RUGG, HAROLD. *An Introduction to American Civilization* (Boston: Ginn and Company, 1929), xiii + 610 pp.

Among the many problems which the junior high-school movement created, none has aroused more interest and discussion than the problem of the social studies in the seventh, eighth, and ninth grades. On the one side are those who stand by the old plane of separate courses in history, geography, and civics; on the other side are those who advocate some sort of unified or fusion course, in which the conventional subject-matter lines are ignored. Among those in the second group, no one has been more active than Dr. Harold Rugg, Professor of Education at Teachers College, Columbia University. During the last decade, with a group of associates, he wrote a number of social science pamphlets, dealing with what he regarded as the leading issues and problems of the day. His selection of the latter was determined by a study of the writings of "frontier thinkers" in the realm of history, politics, economics and so on. Having determined the main issues and problems, Dr. Rugg then had a principle on which to select subject-matter; he would take it from any field of knowledge which promised to aid junior high-school pupils in understanding the topic in hand.

After five or six years of "tryout" in many schools all over the land, Dr. Rugg's material now begins to appear in textbook form. The present volume, the first of the series, deals with the economic life of the United States. Accompanying it is a Pupil's Workbook. While Dr. Rugg has not converted everyone to his view regarding the proper content for the junior high-school course in the social studies, nevertheless, there will be few who will not welcome this volume, with its wealth of dramatic episode and illustrative material to their list of collateral reading at least, even if not to their list of textbooks.

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RESEARCH ABSTRACTS and BIBLIOGRAPHIES

Address all communications relative to research abstracts and bibliographies to Editor A. S. Barr, University of Wisconsin, Madison, Wisconsin.

BULLETINS

BEDNAR, CHRISTINE, EDITOR. "Health Education," *Fifth Yearbook of the Chicago Principals' Club*, June, 1930, 252 pp.

A discussion of the problem of health instruction, prepared by the Chicago Principals' Club. An extensive and useful bulletin for public school teachers.

MELCHER, GEORGE. "Reading," *Kansas City School Service Bulletin*, III No. 1 (September, 1930), 26 pp.

A bulletin summarizing progressive practices in the teaching of reading, designed for the use of teachers in the Kansas City Public Schools.

MELCHER, GEORGE. "Study," *Kansas City School Service Bulletin*, III No. 2 (October, 1930), 104 pp.

A bulletin summarizing the best practices in the development of study habits in pupils, designed for use by the teachers in the Kansas City Public Schools.

Research Bulletin of the National Education Association, "Investing in Public Education." Washington: National Education Association, VIII, No. 4, (September, 1930), 166-219.

A study of public school expenditures discussing the proportion of our income and wealth invested in public education, school expenditures as compared with other expenditures, etc.

SMITH, H. L., AND CHAMBERLAIN, LEO MARTIN. "An Analysis of the Duties of County School Superintendents and Superintendents of Schools in Certain Cities in Indiana," *Bulletin of the School of Education Indiana University*, VI, No. 2 (November, 1929), 94 pp.

A study of the functions of the superintendent of schools in small Indiana cities and counties. The data were collected by the diary method of time consumed. The author presents a classified list of the duties of school superintendents in certain Indiana cities and counties, with the percentage of time devoted to each, and a comparison of these distributions with a theoretical distribution based on the opinions of a group of experts in education.

EDUCATIONAL ADMINISTRATION AND SUPERVISION

BOARDMAN, CHARLES W. "An Analysis of Pupil Ratings of High-School Teachers," *Educational Administration and Supervision*, XVI (September, 1930), 440-446.

A correlation study of the agreement between pupil and supervisory evaluations of high-school teachers. The correlations are not high, indicating that pupils and teachers probably employ different bases in the evaluation of teaching efficiency.

LOCKWOOD, L. A. "Causes of Tardiness," *School Review*, XXXVIII (September, 1930), 538-543.

A study of tardiness in the Rushville, Indiana, High School. The author gives the frequency and time loss for different kinds of tardiness, and concludes that tardiness is more a parent problem than a pupil problem.

REINHARDT, EMMA. "Teachers' Institutes in Illinois," *Elementary School Journal*, XXXI (September, 1930), 25-34.

A statistical study of Teachers' Institutes in the state of Illinois, presenting data on the number of days in each session, the subjects and topics discussed, the number and kinds of instructors, etc.

PSYCHOLOGY OF LEARNING

DORSEY, MATTIE F., AND HOPKINS, L. THOMAS. "The Influence of Attitude upon Transfer," *Journal of Educational Psychology*, XXI (September, 1930), 410-417.

This study reports group and individual data from an equivalent group experiment with college freshmen to determine the amount of transfer depending on readiness to act as built up by suggestion given at the time of performance. The experimental group showed marked superiority over the control groups.

GUTHRIE, EDWIN R. "Conditioning as a Principle of Learning," *Psychological Review*, XXXVII (September, 1930), 412-428.

This paper attempts to show that the main characteristics of learning, such as conditioning, inhibitory conditioning, remote conditioning, the effects of practice, forgetting, temporary extinction, emotional reinforcement, irradiation, response to patterns, and insight, may all be understood as instances of a very simple and very familiar principle, the ancient principle of association by contiguity in time.

KEYS, NOEL, AND WHITESIDE, G. H. "The Relation of Nervous-Emotional Stability to Educational Achievement," *Journal of Educational Psychology*, XXI (September, 1930), 429-441.

The author finds that there is a well-marked and reliable tendency for pupils characterized as conspicuously nervous and emotional to fall far below the emotionally stable in intelligence and school standing.

MCCALLISTER, JAMES M. "Character and Causes of Retardation in Reading among Pupils of the Seventh and Eighth Grades," *Elementary School Journal*, XXXI (September, 1930), 35-43.

This investigation was conducted in the Laboratory School of the University of Chicago during the school years 1926-27 and 1927-28. The author presents a summary of eighteen types of reading deficiencies found among pupils in the seventh and eighth grades, and gives the frequency of occurrence of each.

MELTZER, H. "Individual Differences in Forgetting Pleasant and Unpleasant Experiences," *Journal of Educational Psychology*, XXI (September, 1930), 399-409.

One hundred thirty-two college students were asked to list their experiences for a given interval of time. Two thousand two hundred thirty-one experiences were reported on first recall. Of these 1,393 or 62.43 percent were pleasant, and 838 or 37.37 percent were unpleasant. Of the 2,231 experiences given on the first recall, 1,092 or 48.97 percent were forgotten at the end of six weeks. Of the

pleasant experiences 593 or 42.06 percent were forgotten, and of the unpleasant experiences 499 or 59.53 percent were forgotten. More pleasant than unpleasant experiences are named on the average, and those experiences that are unpleasant are soonest forgotten.

SORENSON, HERBERT. "Adult Ages as a Factor in Learning," *Journal of Educational Psychology*, XXI (September, 1930), 451-459.

The author concludes that mental ability or learning maintains itself, at least for elementary school teachers up to the age of fifty, if it is exercised by the severities of course work for credit.

TEMPLETON, PAYNE. "A Study of Pupil Preferences," *School Review*, XXXVIII (September, 1930), 532-537.

A study of pupil preferences in the Flathead County High School, Kalispell, Montana, indicating the value placed by each pupil upon the different studies and the amount of time spent in outside work on each.

TUTTLE, HAROLD SAXE. "Habit and Attitude," *Journal of Educational Psychology*, XXI (September, 1930), 418-428.

A discussion of the relationship of habit and attitude, with a re-definition of each.

EXPERIMENTAL STUDIES OF TEACHING

LEUBA, CLARENCE J. "A Preliminary Analysis of the Nature and Effects of Incentives," *Psychological Review*, XXXVII (September, 1930), 429-440.

An analysis of the nature of incentives, pointing out their importance in experimental work and the difficulty of controlling them. The author supplies a list of external situations which individuals will exert themselves to bring about or maintain.

SHIRLEY, MARY, AND HEVNER, KATE. "An Experiment in Teaching Laboratory Psychology by the Project Method," *Journal of Applied Psychology*, XIV (August, 1930), 309-354.

An experimental study of the project method carried on in the Department of Psychology at the University of Minnesota for two years previous to 1928. Data were collected from five different project classes and their control classes. The author concludes that students taught by the project method learn as much as regular students when their work is measured by objective examinations, and that the method is somewhat more successful with students who have a decided preference for original work.

CURRICULUM RESEARCH

SMITH, H. E. "The Validity of Teachers' Judgments of Difficulty in Curricular Material," *Journal of Educational Psychology*, XXI (September, 1930), 460-466.

The author concludes that the validity coefficients of judgment ratings obtained from experienced teachers ranged from an average of 0.86 in arithmetic in a descending order through word meaning, physiology, history, geography, and literature, to an average coefficient of 0.45 in language usage.

WHEELER, H. E., AND HOWELL, EMMA A. "A First-Grade Vocabulary Study," *Elementary School Journal*, XXXI (September, 1930), 52-60.

A study of the vocabularies of twenty primary readers including a comparison with Gates' study (1926) of *A Reading Vocabulary for the Primary Grades*. A revised list of words for the first grade is presented by the author.

STATISTICS

COURT, ANDREW T. "Measuring Joint Causation," *Journal of the American Statistical Association*, XXV (September, 1930), 245-254.

A discussion of the inadequacy of the conventional multiple correlation equations in measuring relationships where the elements involved are dependent. The author proposes a new equation for these conditions.

MISCELLANEOUS

BUTSCH, RUSSELL L. C. "The Law of Libel and Slander as It Affects the Teacher," *Elementary School Journal*, XXXI (September, 1930), 44-51.

A summary of the law of libel and slander as it affects the teacher, based upon original source materials.

GARTH, THOMAS R., LOVELADY, BERT E., AND SMITH, HALE W. "The Intelligence and Achievement of Southern Negro Children," *School and Society*, XXXII (September 27, 1930), 431-435.

The subjects of this study were 2,006 negro children, 1,019 of which were found in the Dallas, Texas, public schools and 987 in the urban public schools of Oklahoma. The author finds that the mental growth line of these negro children starts at practically the same point as that of whites, but steadily lags behind with increasing years.

SELECTED BIBLIOGRAPHY ON TECHNIQUES OF EDUCATIONAL RESEARCH AND RELATED PROBLEMS, 1929-1930[1]

I. THE VALUE OF EDUCATIONAL RESEARCH

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CUBBERLEY, E. P. *Public School Administration*, (revised and enlarged). (Boston: Houghton Mifflin Co., 1929). Chapter xxiv.

A chapter on educational research and efficiency, historical development of the research movement, and special research bureaus or departments.

FREEMAN, F. N. "The Contribution of Science to the Principles and Methods of Teaching," *Childhood Education*, VI (April, 1930), 348-54.

GATES, A. I. "Contributions of Psychological Research to Education," *School and Society*, XXXI (April 12, 1930), 485-93.

Shows contribution of psychology to education in the introduction of scientific method, educational philosophy, techniques of education, etc.

LUCKIESH, M. "Science as a Source of Ideas," *Scientific Monthly*, XXIX (September, 1929), 236-42.

NORTON, JOHN K. "The Function of the National Council of Education of the National Education Association," *School and Society*, XXIX (June 29, 1929), 819-24.

STENQUIST, J. L. "Getting Research into Practice in a Large School System," *American School Board Journal*, LXXIX (November and December, 1929), 41-42; 41-42, 131-32.

Discusses the research program in the Baltimore schools.

WILEY, G. M. "The Contribution of Research to the Organization of Secondary Schools," *School and Society*, XXXI (April 19, 1930), 517-22.

WITHERS, J. W. "The Scientific Method in the Study of Education," *Journal of Educational Research*, XXI (March, 1930), 212-20.

[1] Supplementary to bibliographies included in Carter V. Good, *How to Do Research in Education*, 1928 and 1929, and *Teaching in College and University*, Baltimore: Warwick and York, 1929. Covers the period from approximately July 1, 1929, to May 1, 1930.

Discusses in detail the possibilities for research in public-school systems, bureaus of research, and the qualifications of the director of research.

II. SOURCES OF INFORMATION IN EDUCATION, BIBLIOGRAPHIES

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A list of current literature.

Allen, E. S. "Periodicals for Mathematicians," *Science*, LXX (December 29, 1929), 592-94.
An analysis of frequency of mention of references to various mathematical journals in certain important mathematical publications.

Anderson, Ruth E. "The Colleges in Current Literature," *Association of American Colleges Bulletin*, XV (December, 1929), 528-34.

Angell, R. C. "Cooley's Heritage to Social Research," *Social Forces*, VIII (March, 1930), 340-47.

Bills, A. G. "Mental Work," *Psychological Bulletin*, XXVI (August, 1929), 499-526. Includes a bibliography of ninety-four references.

Bolton, F. E. "Great Contributors to Education: I, William James," *Progressive Education*, VII (March, 1930), 82-88.

Carlson, Pearl G. "Periodicals and Their Indexing," *Peabody Journal of Education*, VI (July, 1928), 30-32.
Lists and describes the various periodical indexes.

Cattell, J. M. "Early Psychological Laboratories," *Science*, LXVII (June 1, 1928), 543-48.

Cattell, J. M. "Psychology in America," *Science* LXX (October 11, 1929), 335-47.
Discusses the distribution and organization of psychologists.

Cattell, J. M. "Psychology in America," *Scientific Monthly*, XXX (February, 1930), 114-26.
Traces the historical development of the science and includes photographs of a number of prominent workers.

Clark, R. "The Periodical Reading of Teachers-to-Be," *School and Society*, XXX (December 7, 1929), 773-75.
Based on the statements of 149 prospective teachers.

Darrow, C. W. "Psychological Effects of Drugs," *Psychological Bulletin*, XXVI (August, 1929), 527-45.
Includes a bibliography of 154 items.

Davis, S. D. "Inter-Library Loans," *University of Pittsburgh School of Education Journal*, V (December, 1929), 38.
A statement of the way in which unusual books and manuscripts such as theses may be borrowed from libraries.

Eells, W. C. "1930 as a Centennial Year in the History of Education," *School and Society*, XXXI (February 1, 1930), 153.

Elsbree, W. S., Halsey, H. R., and Elsbree, E. S. *The Teacher's Handbook*. (New York: Bureau of Publications, Teachers College, Columbia University, 1929), 290 pp.

Fowler, R. W. "Annotated Bibliography of Supervisory Devices in Industrial Arts," *Industrial Arts Magazine*, XIX (February, 1930), 56-59.
Includes thirty-three annotated references.

Garvey, C. R. "List of American Psychology Laboratories," *Psychological Bulletin*, XXVI, (November, 1929), 652-60.
Lists for 117 institutions information concerning date of first psychology laboratory, first director, amount of orig-

inal grant, date of first publication, and author.

Graham, Hugh. "The Rise and Progress of the College of Education of the University of Minnesota," *School and Society*, XXXI (April 12, 1930), 510-13.

Gray, W. S. "Summary of Reading Investigations (July 1, 1928, to June 30, 1929), I and II," *Elementary School Journal*, XXX (February and March, 1930), 450-66, 496-508.
Includes a bibliography of 113 references.

Griffith, C. R. "Studies in the Psychology of Athletics," *Journal of Health and Physical Education*, I (March, 1930), 9-12, 60.
Summarizes investigations in this field.

Hamor, W. A., and Bass, L. W. "Bibliochresis: The Pilot of Research," *Science*, LXXI (April 11, 1930), 375-78.
Points out the importance of scientific use of available literature in research.

Henmon, V. A. C. "Educational Psychology," *Psychological Bulletin*, XXVI (July, 1929), 445-56.
Includes a bibliography of 217 references.

Irwin, Manley. "A Summary of Special Investigations of the Effect of the Size of Class upon the Effectiveness of Instruction," *North Central Association Quarterly*, IV (December, 1929), 352-57.

Jensen, M. B., and Jensen, Dortha W. "The Influence of Class Size upon Pupil Accomplishment in High-School Algebra," *Journal of Educational Research*, XXI (February, 1930), 120-37.
Reviews experiments dealing with class size in pupil and teacher efficiency.

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Includes a bibliography of 121 references.

Kandel, I. L. "The Influence of Dewey Abroad," *Teachers College Record*, XXXI (December, 1929), 239-44.

McCabe, Martha R., and Evans, H. R. "The Library of the Office of Education and Some of Its Special Collections," *School Life*, XV (November, 1929), 47-49.

McGeoch, J. A. "The Acquisition of Skill," *Psychological Bulletin*, XXVI (August, 1929), 457-98.
Includes a bibliography of 107 references.

McKee, Paul. "Books and Pamphlets Received January 1, 1929, to July 25, 1929," *Teachers Journal and Abstract*, IV (September, 1929), 376-82.
A classified list of current publications.

McKee, Paul. "Books and Pamphlets Received July 25, 1929, to December 25, 1929," *Teachers Journal and Abstract*, V (January, 1930), 50-54.

McKinney, Katharine. "Analysis of Researches in Educational Guidance in Secondary Schools," *University of Pittsburgh School of Education Journal*, V (March, 1930), 77-83.
Covers sixty-nine studies which appeared from 1918 to 1925 inclusive.

McVey, F. L. "The Annual Review of College Surveys," *Association of American Colleges Bulletin*, XVI, (March, 1930), 121-26.

Mason, Grace E. "Bibliography on Methods for Personal Development of College Students," *Educational Record* (Supplement), XI (January, 1930), 1-42.
Includes two hundred items.

May, Mark A., Hartshorne, Hugh, and Welty, Ruth E. "Personality and Character Tests," *Psychological Bulletin*, XXVI (July, 1929), 418-44.

Includes a bibliography of 199 references.

Miller, W. S., and Otto, H. J. "Analysis of Experimental Studies in Homogeneous Grouping," *Journal of Educational Research*, XXI (February, 1930), 95-102.

Includes a bibliography of twenty references.

Newlon, J. H. "John Dewey's Influence in the Schools," *Teachers College Record*, XXXI (December, 1929), 224-38.

Palmer, A. M. "The New College Presidents—Class of 1929," *Personnel Research*, VIII (April, 1930), 393-98.

Appraises the forty-five recent recruits to the occupation of college president.

Palmer, A. M. "Newly Elected College Presidents," *School and Society*, XXX (December 21, 1929), 852-56.

Discusses fifty-five recent changes in college presidencies and gives information concerning the experience, vital statistics, motives in acceptance, etc., of these new presidents.

Phillips, F. M. *Statistics of Private High Schools and Academies, 1927-1928.* Bureau of Education Bulletin No. 19. (Washington: Bureau of Education, 1929). 62 pp.

Pillsbury, W. B. *The History of Psychology.* (New York: W. W. Norton Co., 1929), 326 pp.

Pintner, Rudolf. "Intelligence Tests," *Psychological Bulletin*, XXVI (July, 1929), 381-95.

Includes a bibliography of 125 references.

Ryan, W. C. *The Literature of American School and College Athletics.* Carnegie Foundation for the Advancement of Teaching Bulletin, No. 24. (New York: Carnegie Foundation for the Advancement of Teaching, 1929), xlvi + 306 pp.

Includes a classified and annotated bibliography of 1,030 items.

Thomas, M. H., and Schneider, H. W. *A Bibliography of John Dewey.* New York: Columbia University Press, 1929.

An annotated, chronological list of more than two thousand items.

Walters, Raymond. "The Association of American Colleges," *School and Society*, XXXI (February 8, 1930), 201-6.

A report on the meeting at Washington from January 14-16, 1930.

Watson, Goodwin B., and Biddle, Delia H. *A Year of Research, 1927.* Chicago: Religious Education Association, 1929.

A classified discussion and annotated bibliography of 506 investigations bearing upon the programs of religious, educational, and social agencies; emphasis on religious and character education.

Wheeler, J. L. "Educational Books of 1929," *School and Society*, XXX (December 28, 1929), 857-73.

A classified list of more than five hundred titles.

Wheeler, J. L. "Sixty Educational Books of 1929," *School and Society*, XXXI (March 29, 1930), 435-37.

Wheeler, J. L. "Sixty Educational Books of 1929," *Journal of the National Education Association*, XIX (April, 1930), 129-32.

Wright, Edith A. *Bibliography of Research Studies in Education: 1927-1928.* Office of Education Bulletin No. 36 (Washington: Office of Education, 1929), x + 226 pp.

A bibliography of 2,403 items.

"Book Reviews," *Association of American Colleges Bulletin*, XV (December, 1929), 535-41.

Covers new publications in higher education.

"Development of Public High Schools," *Journal of the National Education Association*, XIX (January, 1930), 20.
Growth by states of high schools during the present century.

"Educational Books of 1929 Published in England," *Journal of the National Education Association*, XIX (April, 1930), 114.
A selected list of important English publications.

"Forty American Books of 1928," *Journal of the National Education Association*, XVIII (December, 1929), 313-14.
A list selected by the American Library Association at the request of the International Institute of Intellectual Coöperation of the League of Nations.

"Foundations for Research," *Journal of Educational Research*, XX (December, 1929), 387-88.
Lists fifteen boards and foundations which dispense funds for the promotion of education.

"John Dewey," *Journal of the National Education Association*, XVIII (December, 1929), 281-95.
A series of articles describing the educational philosophy and contributions of Dewey; a summary of the addresses presented at the celebration of his seventieth birthday.

"The Library of the Office of Education," *Elementary School Journal*, XXX (March, 1930), 482-84.
Description of the valuable collection of pedagogical literature in this library.

"Membership in the Departments of the National Education Association, 1929," *Journal of the National Education Association*, XVIII (December, 1929), 316.
Statistics on membership by states in the Departments of Superintendence, Secondary School Principals, and Elementary School Principals.

Psychological Register. Edited by Carl Murchison and Others. (Worcester, Massachusetts: Clark University Press, 1929), 580 + x pp.
Lists professional training, honors, positions, appointments, and publications of the world's living psychologists.

Who's Who in American Education, Vol. I, 1928. Edited by R. C. Cook. (New York: Who's Who in American Education). 368 pp.
A biographical dictionary of living, eminent educators of the United States.

III. TECHNICAL VOCABULARY AND TERMINOLOGY IN EDUCATION

Arthur, J. C. "Proposed Amendments to the International Rules of Nomenclature," *Science*, LXX (October 4, 1929), 330.
Deals with nomenclature in botany.

Brace, D. K., and Others. "Reports of the Committee on Terminology in the Measurement of Physical Education," *American Physical Education Review*, XXXIV (September, 1929), 393-405.

Davis, R. A., and Gould, S. E. "Changing Tendencies in General Psychology," *Psychological Review*, XXXVI (July, 1929), 320-31.
An analysis of 110 texts in general psychology published over a thirty-nine year period.

Frank, J. O., and White, H. K. *High-School Science Terminology: Chemistry and Physics.* (Oshkosh, Wisconsin: J. O. Frank and Sons, 1930), 204 pp.

Haggerty, M. E. *Topics in Psychology.* (Minneapolis, Minnesota: University of Minnesota Press, 1929).
Includes 2,584 items, which provide a technique for study of curricular prob-

lems in psychology, analysis of textbooks, formulation of examinations, indication of available knowledge, etc.

Haggerty, M. E. "Remaking the Psychology Curriculum," *Journal of Higher Education*, I (February, 1930), 78-84.
Describes a check list secured by a content analysis of psychology textbooks.

Henderson, Junius. "Biological Nomenclature," *Science*, LXXI (March 14, 1930), 286-87.

Roller, Duane. *The Terminology of Physical Science*. (Norman, Oklahoma: University of Oklahoma Press, 1929). 116 pp.

Rugg, E. W. "What Educational Terminology Should a Beginning Teacher Know?" *Educational Administration and Supervision*, XVI (March, 1930), 187-95.
Based on an analysis of five general introductory textbooks in education and a sampling of eleven educational periodicals; 2109 different concepts including derivatives were found.

"The National Joint Commission on Terminology, Functions and Relations in Supervision," *Educational Method*, IX (April, 1930), 437.
States the purposes of the Commission.

Report of the Committee on Terminology, Federated Council on Art Education. (Baltimore: L. L. Winslow, Director of Art Education, Public Schools), 70 pp.

IV. CHARACTERISTICS OF SCIENTIFIC INVESTIGATIONS

Burr, S. E. "Road to Scientific School Administration," *School Executives Magazine*, XLIX (December, 1929), 166-68.
Discusses the development of scientific method in the administration of education.

Cobb, J. C. "A Study of Social Science Data and Their Use," *American Journal of Sociology*, XXXV (July, 1929), 80-92.
Urges use of scientific method rather than "dialectic" method.

Dewey, John. *The Sources of a Science of Education*. (New York: Horace Liveright, 1929), 78 pp.

Frost, Norman. "To Err Is Human," *Peabody Journal of Education*, VII (January, 1930), 245-46.
Urges the elimination of the personal element and bias in educational research.

McKnown, H. C. "Fools and Foolishness," *University of Pittsburgh School of Education Journal*, V (December, 1930), 35-37.
Emphasizes the desirability of maintaining an openminded and inquiring attitude toward changes in materials, methods, objectives, etc.

Ogburn, W. F. "The Folk-Ways of a Scientific Sociology," *Scientific Monthly*, XXX (April, 1930), 300-306.
Discusses scientific method in sociology.

Strayer, G. D. "Rise of Public School Administration," *School Executives Magazine*, XLIX (September, 1929), 14-15.
Discusses scientific procedure and research in school administration.

Weaver, Warren. "Science and Imagination," *Scientific Monthly*, XXIX (November, 1929), 425-34.
Considers the relationship between physics and mathematics, between mathematics and art, and the role of the imagination in the development of physics and mathematics.

Williams, S. R. "The Spirit and Method of Research in Undergraduate

Courses," *School Science and Mathematics*, XXIX (October, 1929), 720-27.

Wilson, H. E. "Curricular Experimentation in the Social Studies," *Historical Outlook*, XX (December, 1929), 390-95.

"Initiation Practices of Phi Delta Kappa," *Phi Delta Kappan*, XII (December, 1929), 122-26.
Includes some interesting definitions of research and scientific procedure.

V. SELECTING AND DEFINING A PROBLEM FOR INVESTIGATION: NEEDED RESEARCH IN EDUCATION, PROJECTS UNDER WAY

Ashbaugh, E. J. "Research Needed to Adjust High-School Curricula to Educational Needs of the Individual," *Journal of Educational Research*, XX (September, 1929), 132-33.

Barr, A. S. "Planning a Year's Growth," *Journal of Educational Research*, XX (September, 1929), 133-35.
Indicates twenty-one aspects of administration and supervision which may well be studied.

Burr, S. E. "Trends in Education," *Education*, CXI (April 7, 1930), 389-90.
A tabulation of frequency of mention of problems emphasized in the thinking and writing of twenty-three city school superintendents.

Burton, W. H. "Probable Next Steps in the Progress of Supervision," *Educational Method*, IX (April, 1930), 402-6.

Jones, A. J. "Committee on Problems of Secondary and Higher Education," *School and Society*, XXX (July 6, 1929), 26-27.
A committee of the Association of Colleges and Secondary Schools of the Middle States and Maryland.

Krey, A. C. "Report of Progress of the Investigation of the Social Studies," *Historical Outlook, XXI* (February, 1930), 63-66.

Kulp, D. H. Problems of Rural Education Demanding Sociological Research," *Teachers College Record*, XXXI (January, 1930), 332-38.
Lists problems under the headings of policy making and administration, teaching, extra-curricular activities, schools and communities, and professional preparation of teachers.

McClusky, H. Y. "A Neglected Laboratory for the Study of Youth," *University of Michigan School of Education Bulletin*, I (December, 1929), 33-34.
States certain of the difficulties involved in studying youth and mentions the summer camp as an excellent opportunity for observation and study of all phases of living on the part of children.

Mann, C. R. "The National Advisory Committee on Education," *Educational Record*, XI (January, 1930), 24-37.
Describes current projects of the Committee.

Moore, Elizabeth S. "Can A Teacher of Young Children Carry on Research?" *Childhood Education*, VI (January, 1930), 197-200.
Lists problems for investigation, methods of attack, and cites a few studies under way or completed.

Noble, M. C. S. *Current Reports on Activity Programs, Projects, Research Studies, Etc., in North Carolina.* Educational Publication, No. 139. (Raleigh, North Carolina: State Superintendent of Public Instruction, 1929), 48 pp.

Noble, M. C. S. "A Research Program for Rural School Supervisors," *Certain Phases of Rural School Supervision*, pp.

12-15. Bureau of Education Bulletin No. 28. Washington: Bureau of Education, 1929.
Includes specific suggestions concerning research problems and procedures for the rural supervisor.

Parkinson, W. D. "Problems for Research—I," *Journal of Education*, CX (November 4, 1929), 381, 383.
Discusses the need for investigation of the limits of compulsory attendance.

Parkinson, W. D. "Problems for Research—II," *Journal of Education*, CX (November 11, 1929), 408-9.
Suggests that the relation between schooling and crime be investigated.

Parkinson, W. D. "Problems for Research,—III," *Journal of Education*, CX (November 18, 1929), 438, 441.
Asks whether public education can continue on only a partially subsidized basis.

Parkinson, W. D. "Look into This 'Feminizing'," *Journal of Education*, CX (November 25, 1929), 460-62.
Suggests that the effect of women teachers on boys and girls be investigated.

Pence, O. E. "Personnel Research in the Y.M.C.A.: Progress on a Five-Year Program," *Personnel Research*, VIII (April, 1930), 375-83.

Strang, Ruth. "The Relation of the Dean of Women to Research," *Teachers College Record*, XXXI (October, 1929), 44-49.
Suggested needed and useful types of research.

Thorndike, E. L. "The Need of Fundamental Analysis of Methods of Teaching," *Elementary School Journal*, XXX (November, 1929), 189-91.
Uses illustrations from grammar, arithmetic, and spelling.

Touton, F. C. "Research Activities in California School Departments," *California Quarterly of Secondary Education*, V (October, 1929), 5-36.
A summary of research projects under way in California research departments.

Tyson, Levering. "A National Council for Radio Education," *Journal of Adult Education*, II (April, 1930), 144-51.
A proposal resulting from the radio study of the American Association for Adult Education.

Washburne, C. W. "Needed Research in Curriculum Building," *Journal of Educational Research*, XXI, (March, 1930), 221-23.

Whitford, W. G. *An Introduction to Art Education*. (New York: D. Appleton and Co., 1929), Chapter xx.
A list of one hundred problems in art education and a discussion of research in this field.

"Activities of the Social Studies Investigation," *Journal of Educational Research*, XXI (January, 1930), 72.
States the personnel of the Commission on Direction.

Annual Report of the Commissioner of Education. (Washington: Department of the Interior, 1929), iv + 50 pp.
Lists the projects completed by the Office of Education and those under way.

"California Public Administration Teaching and Research Project," *School and Society*, XXXI (January 4, 1930), 9-10.
Describes a state and University of California project in government which extends over a six-year period and is sponsored by the Rockefeller Foundation.

"Commission on the Investigation of History in the Schools," *School and So-*

ciety, XXX (December 7, 1929), 765-66.

Lists the personnel of the commission and the advisory committees.

"Comparative Study of the Secondary Schools in England and in the United States," *School and Society*, XXX (August 24, 1929), 261-62.

Lists the personnel of the committee involved.

"An Intensive Study of College Freshmen," *School Review*, XXXVIII (April, 1930), 252-55.

A study sponsored by the State Department of Public Instruction in Pennsylvania and supported in part by the Carnegie Foundation for the Advancement of Teaching.

"Junior College Survey in California," *Journal of Educational Research*, XXI (March, 1930), 240.

Reports progress of the survey under the direction of W. C. Eells of Stanford University.

"A Maryland Commission on the Relation of Higher Education to the State," *School and Society*, XXXI (February 15, 1930), 221-22.

A commission appointed by the governor to study the problem of higher education and to recommend a policy for 1931.

"A Nation-Wide Educational Survey," *American School Board Journal*, LXXX (March, 1930), 46-47.

Includes pictures of the consulting committee of the national survey of secondary education.

"The National Advisory Committee on Education," *School Review*, XXXVIII (January, 1930), 2-3.

Lists the five functions of the federal government in education to be studied by the committee: to gather and disseminate adequate statistics, to conduct research, to maintain and make accessible an educational library, to maintain a legislative digest and information service, and to furnish survey experts on request to states and communities.

"The National Survey of Secondary Education," *Journal of Educational Research*, XXI (April, 1930), 319-20.

Lists problems to be studied and personnel of the advisory committee of thirty members.

"Projects for 1929-30," *Educational Research Bulletin* (Ohio State University), VIII (October 23, 1929), 345-49.

A statement of current projects of the Bureau of Educational Research of Ohio State University.

"Projects in Supervision," *School Review*, XXXVIII (January, 1930), 11-13.

A list of twenty-nine ways in which eighteen high-school principals and supervising principals think instruction should be improved.

"Projects of the Bureau for 1928-1929," *Educational Research Bulletin*, (Ohio State University), VIII (October 9, 1929), 321-26.

A statement of the investigations made by the Bureau of Educational Research of Ohio State University during 1928-29.

"Research Projects of the Bureau of Reference and Research of the New York City School System," *Elementary School Journal*, XXX (October, 1929), 94-95.

Lists the activities of the Bureau over a period of a year.

"The Second Annual Conference of State Superintendents and Commissioners of Education," *School and Society*, XXX (December 28, 1929), 879-80.

Lists the problems discussed and the officers who attended the meeting.

"A Survey of Library Schools by the American Library Association," *School and Society*, XXXI (March 29, 1930), 425.

A survey of thirteen southern states, directed by Sarah C. N. Bogle, financed by the Carnegie Corporation of New York.

"The Ten-Year Program," *Educational Method*, IX (April, 1930), 385-86.

Outlines the contemplated yearbooks of the Department of Supervisors and Directors of Instruction.

"A Survey of Theological Education," *School and Society*, XXXI (February, 1930), 222-23.

A three-year study by the Conference of Theological Seminaries and the Institute of Social and Religious Research; lists the executive committee of the study.

VI. TYPES OF RESEARCH, METHOD OF COLLECTING DATA

Ayer, F. C. "The Duties of Public-School Administrators, VI and VII," *American School Board Journal*, LXXIX (August and October, 1929), 52-53, 119-20; 33-34, 136.

An example of the technique of job analysis.

Brewer, J. M., and Others. *Cases in the Administration of Guidance.* (New York: McGraw-Hill Book Co., 1929), 304 pp.

A book of 149 cases dealing with the administration of educational and vocational guidance; includes a chapter on the case method.

Buckingham, B. R. "Statistics and Modern Educational Thought," *School and Society*, XXXI (March 22, 1930), 379-85.

Concludes that statistical method is important but should be substituted for thinking.

Caswell, H. L. *City School Surveys.* Teachers College Contributions to Education, No. 358. New York: Teachers College, Columbia University, 1929.

Discusses the historical development of the movement, elements in the well-organized survey, effectiveness in accomplishing changes, and contribution to administrative standards and methods of measurement.

Caswell, H. L. "Is the School Survey Movement Dead?" *Peabody Journal of Education*, VII (September, 1929), 108-14.

Enumerates the surveys made since 1910, by years, and indicates the organizations active in making surveys.

Caswell, H. L. "Outstanding City School Surveys," *School and Society*, XXXI (February 1, 1930), 156-59.

Cavan, Ruth S. "Interviewing for Life-History Material," *American Journal of Sociology*, XXXV (July, 1929), 100-15.

Based on an analysis of seventy-five references which involved interview methods.

Charters, W. W. "Questionnaires," *Educational Research Bulletin* (Ohio State University), IX (March 5, 1930), 137.

Comments on the questionnaire bulletin of the Research Division of the National Education Association.

Clarke, E. L. *The Art of Straight Thinking.* (New York: D. Appleton and Co., 1929), xii + 470 pp.

Clugston, H. A., and Davis, R. A. "Is a Scientific Method Possible for Philosophical Research in Education?" *Educational Administration and Supervision*, XVI (April, 1930), 293-99.

Crump, C. G. *History and Historical Re-*

search. London: George Routledge and Sons, 1928.

Finney, R. L. "Philosophy versus Science Again," *Educational Administration and Supervision,* XVI (March, 1930), 161-73.

Emphasizes that subjective insights may in the long run be of more enduring value than facts collected by objective methods.

Gay, E. F. "Historical Records," *Scientific Monthly,* XXX (April, 1930), 289-94.

Gee, Wilson, and Others. *Research in the Social Sciences:* Its Fundamental Methods and Objectives. (New York: Macmillan Co., 1929), x + 306 pp.

Good, H. G. "Historical Research in Education," *Educational Research Bulletin* (Ohio State University), IX (January 8 and 22, and February 5, 1930), 7-18, 39-47, 74-78.

An exposition of principles to be observed in the use of the historical technique of educational research.

Greenan, J. T. "The Case Method in the Teaching of Problems of Democracy," *School Review,* XXXVIII (March, 1930), 200-205.

Holzinger, K. J., and Mitchell, B. C. *Exercise Manual in Statistics.* (Boston: Ginn and Co., 1929), vi + 160 pp.

Hopkins, L. T. *Curriculum Principles and Practices.* (Chicago: Benjamin H. Sanborn and Co., 1929), xiv + 618 pp.

Hullfish, H. G. "A Crucial Problem for Philosophy of Education," *Educational Administration and Supervision,* XVI (April, 1930), 241-48.

Hullfish, H. G. "The Relation of Philosophy and Science in Education," *Journal of Educational Research,* XX (October, 1929), 159-65.

Urges that both educational philosophy and systematic investigation are essential for the guidance of workers in education.

Kelley, T. L. "The Scientific versus the Philosophical Approach to the Novel Problem," *Science,* LXXI (March 21, 1930), 295-302.

Shows the need for both approaches and gives illustrations.

Kilpatrick, W. H. "Philosophy and Research," *School and Society,* XXX (July 13, 1929), 39-48.

Loomis, H. B. "Educational Philosophy: Change, Invariance, or Both?" *School Review,* XXXVIII (April, 1930), 256-62.

Suggests that the path of progress in education is to learn the past, observe the present, and look for invariants—the factors that remain unchanged in the realm of the abstract no matter how great the change in the realm of the concrete.

Lundberg, G. A. *Social Research: A Study in Methods of Gathering Data.* (New York: Longmans, Green and Co., 1929), x + 380 pp.

MacDonald, Marion E. *Practical Statistics for Teachers.* New York: Macmillan Co., 1930.

Maxfield, F. N. "The Case Study," *Educational Research Bulletin* (Ohio State University), IX (March 5, 1930), 117-22.

Describes with illustrations the case technique of educational investigation.

Monroe, W. S. "Difficulties in Educational Research," *Educational Research Bulletin* (Ohio State University), IX (January 8, 1930), 1-6.

Emphasizes especially fallacies in statistical methods of research.

Monroe, W. S., and Engelhart, M. D. *Experimental Research in Education.* University of Illinois Bulletin Vol.

XXVII, No. 32. (Urbana, Illinois: University of Illinois, 1930), 106 pp.
Discusses the historical development of the experimental method, requirements for controlled group experimentation, interpretation of differences in gains, experimental studies relating to supervised study, and the experimental method as a procedure in educational research.

Moore, E. C. "John Dewey's Contribution to Educational Theory," *School and Society*, XXX (January 11, 1930), 37-47.

Neilson, N. P. "Job Analysis Technique Should Be Applied to Physical Education," *Journal of Health and Physical Education*, 1 (January, 1930), 9, 45.

Nichols, R. F. "Historical Research in Colleges," *Historical Outlook*, XX (October, 1929), 280-82.
Urges the adoption of an organized plan for historical research in colleges.

Odum, H. W., and Jocher, Katherine. *An Introduction to Social Research*. (New York: Henry Holt and Co., 1929), xiv + 488 pp.
A detailed discussion of the techniques of social research.

Park, R. E. *Research in the Social Studies*. (New York: Macmillan Co., 1929), 306 pp.

Rice, S. A. "Contagious Bias in the Interview: A Methodological Note," *American Journal of Sociology*, XXXV (November, 1929), 420-23.
Shows the transfer of the investigator's bias to the applicant and the corresponding distortion of the replies given.

Ruch, G. M. *The Objective or New-Type Examination*. (Chicago: Scott, Foresman and Co., 1929), x + 478 pp.

Ruckmick, C. A. "The Uses and Abuses of the Questionnaire Procedure," *Journal of Applied Psychology*, XIV (February, 1930), 32-41.

Russell, Charles. *Standard Tests*. (Boston: Ginn and Co., 1930), vi + 516 pp.

Smith, Vivian T. "An Educational Philosophy," *Educational Administration and Supervision*, XVI (February, 1930), 88-98.
States a philosophy consisting of four propositions: that education is possible, that it is possible in varying degrees with different individuals, that education is democratic, and that education is living.

Tait, W. D. "Science and Education," *Scientific Monthly*, XXIX (August, 1929), 132-36.
Emphasizes the experimental method in determining principles of educational method.

Thomas, Dorothy S. "Statistics in Social Research," *American Journal of Sociology*, XXXV (July, 1929), 1-17.
Emphasizes the importance of statistical analysis as a tool for the sociologist.

Thomas, Dorothy S., and Associates. *Some New Techniques for Studying Social Behavior*. Child Development Monographs, No. 1. (New York: Teachers College, Columbia University, 1929), x + 204 pp.
A treatment of the laboratory method as utilized in the nursery school for the study of the social activity of children.

Tyler, R. W. "A Course in History of Education," *Educational Research Bulletin* (Ohio State University), LX (February 5 and March 5, 1930), 57-65, 133-35.
An organization of the course in terms of the data of the Commonwealth Teacher-Training Study, with illustrations.

Walker, Helen M. *Studies in the History of Statistical Method.* (Baltimore: Williams and Wilkins Co., 1929), viii + 230 pp.

Special reference to educational problems.

Waples, Douglas, and Tyler, R. W. *Research Methods and Teachers' Problems.* New York: Macmillan Co., 1930.

Shows the teacher how to apply the most productive type of research technique to classroom situations.

Whipple, G. M. "What Price Curriculum-Making?" *School and Society,* XXXI (March 15, 1930), 367-68.

Points out some of the dangers in curriculum-making by committees and by amateurs.

Wilson, E. B. "Mathematics and Statistics," *Scientific Monthly,* XXX (April, 1930), 294-300.

Woodworth, R. S. "How to Discipline Professors," *School and Society,* XXXI (March 22, 1930), 398-99.

A discussion of the misuse of sex questionnaires and of the shortcomings of the questionnaire method in attacking such intimate problems.

Young, E. F. "The Scientific Study of Social Case Histories," *Sociology and Social Research,* XIV (March-April, 1930), 358-64.

The Questionnaire. Research Bulletin of the National Education Association, Vol. VIII, No. 1. (Washington: National Education Association, 1930), 52 pp.

A thorough treatment of the case for and against questionnaires, better preparation of questionnaires, reporting results, coöperative regulation of this method of investigation, and the questionnaire problem from the viewpoint of the superintendent of schools.

VII. PROBLEMS INVOLVED IN THE ANALYSIS, ORGANIZATION, AND SUMMARIZATION OF DATA: TABULAR AND GRAPHIC PLESENTATION

Lee, A. E. "A General Statistical Office in a University," *School and Society,* XXX (October 12, 1929), 508-12.

Thatcher, R. W. "The Need for an International Repository for Original Research Data," *Science,* LXX (August 16, 1929), 167-68.

Walls, G. L. "The Preparation of Charts for Publication," *Science,* LXX (October 18, 1929), 380.

Outlines a rough method for estimating the width of charts after reduced for publication.

VIII. INTERPRETATION OF DATA AND FORMULATION OF CONCLUSIONS

Morgan, J. E. "Educational Interpretation and the Printed Word," *School and Society,* XXX (July 20, 1929), 79-83.

Discusses the contribution of the administrator, the investigator, and the interpreter.

Morgan, J. E. "The Need for Educational Interpretation," *Journal of the National Education Association,* XIX (February, 1930), 37-38.

Comments on the work of the administrator, investigator, and interpreter in education; states that the interpreter must understand human nature, know the schools, understand the channels through which interpretation is carried on, and know civilization.

"Education and Propaganda," *Journal of Adult Education,* II (April, 1930), 188-90.

Points out the danger of propaganda to poorly or partially educated persons, which are in the majority.

"Interpreting the Public's Schools,"

Journal of the National Education Association, XIX (March, 1930), 71-82.
Emphasizes desirable practices in the handling of school news and publicity programs.

IX. REPORTING EDUCATIONAL RESEARCH AND THE PREPARATION OF A MANUSCRIPT FOR PUBLICATION

Louttit, C. M. "The Use of Bibliographies in Psychology," *Psychological Review*, XXXVI (July, 1929), 341-47.
Based on a canvass of 144 periodicals in psychology and related fields over the period 1900-27; 2134 bibliographies were discovered.

Mees, C. E. K. "The Publication of Papers from Research Institutions," *Science*, LXX (November 22, 1929), 502.
Discusses the merits of publication in the journals of scientific societies as compared with the bulletins of local institutions.

Miller, D. W. "Research on Higher Education," *Journal of Higher Education*, I (March, 1930), 160-61.
Urges that a list of theses in higher education with a summary of each be distributed in some appropriate manner.

St. John, J. L. "A Unified System of Presenting Bibliographies," *Science*, LXX (August 30, 1929), 217.

Stiles, C. W. "Absent-Mindedness as a Factor in Professional Ethics," *Science*, LXX (January 24, 1930), 100-101.
Cites six striking cases of plagiarism.

"Antiquated Statistics," *Elementary School Journal*, XXX (September, 1929), 4.
Criticizes a representative of the Federal Board for Vocational Education who has used obsolete statistics in an address.

X. EVALUATING EDUCATIONAL WRITINGS AND PROFESSIONAL BOOKS

Barr, A. S. "The Activities Curriculum," *Journal of Educational Research*, XXI (January, 1930), 49-51.
States the criticisms of the traditional curriculum and of the new activities curriculum.

Barr, A. S. "Address to the Phi Chapter Neophytes," *Phi Delta Kappan*, XII (April, 1930), 190, 193.
Lists eight shortcomings in current educational research.

Brooks, F. D. "On Assigned Marks," *Journal of Educational Research*, XXI (April, 1930), 297-98.
Discusses the fallacy in assigning marks according to the normal curve of distribution in a small or a select group of individuals.

Burr, S. E. "The Selection of Textbooks and the Use of Rating Scales," *American School Board Journal*, LXXIX (August, 1929), 130.
Includes a reproduction of a rating scale.

Counts, G. S. "Criteria for Judging a Philosophy of Education," *School and Society*, XXX (July 27, 1929), 103-7.
States that a good philosophy should be systematically empirical in foundations, comprehensive in outlook, consistent in its several departments, practicable in its provisions, and satisfying to its adherents.

Courtis, S. A. "Significant Criteria for the Appraisal of the Validity of Contemporary Educational Philosophy," *Educational Method*, IX (November, 1929), 66-72.

Fernberger, S. W. "Educational Sci-

ence!'' *Science*. LXX (July 12, 1929), 39.

Comments on a careless error in the construction of a standard test.

Freeman, E. M. ''Criteria for Judging a Science of Education,'' *School and Society*, XXX (July 13, 1929), 48-52.

Freeman, F. N. ''The Contribution of Science to Education,'' *School and Society*, XXX (July 27, 1929), 107-12.

Discusses the contribution of studies of learning and of the nature, capacities, and development of the child; suggests that too many studies have been trivial, negative in their conclusions, and for the purpose of appraisal rather than discovery.

Good, Carter V. ''Educational Yearbooks and Annual Professional Programs,'' *School and Society*, XXXI (forthcoming, May, 1930).

Suggestions for the improvement of yearbooks and scientific and scholarly meetings.

Harap, Henry. ''A Critique of Public School Courses of Study 1928-1929,'' *Journal of Educational Research*, XXI (February, 1930), 109-119.

Based on a review of 242 courses of study.

Jastrow, Joseph. ''The Conflict of the Psychologies,'' *Scientific Monthly*, XXIX (November, 1929), 411-16.

Knudsen, C. W. ''Experience versus Experimentation,'' *Peabody Journal of Education*, VII (January, 1930), 242-43.

Points out that certain new movements such as the junior college and the junior high school have been promoted by propaganda and tested undiscriminatingly at public expense rather than by subsidized experimentation.

Lucasse, Florence J. ''What the Classical Investigation Has Accomplished,'' *Journal of Educational Research*, XX (June, 1929), 15-21.

Marye, Mary E. ''A Form for Rating Textbooks in English Composition Prepared for the Ninth and Tenth Grades,'' *School Review*, XXXVIII (February, 1930), 124-37.

Phelps, Shelton. ''Consider Critically the Courses You Study?'' *Peabody Journal of Education*, VII (January, 1930), 43-45.

Comments on certain major studies of educational problems now under way and suggests out of such attempts should come assistance in organizing the teacher-training program.

Scott, C. F. ''Investigation of Engineering Education,'' *Journal of Higher Education*, I (February, 1930), 91-97.

Suggests that there are no glaring defects in the policies and methods of engineering education, that the curriculums are sound, and that engineering graduates have proved well adapted to needs.

Tyler, R. W. ''The Need for Adequate Data,'' *Educational Research Bulletin* (Ohio State University), VIII (December 4, 1929), 404-6.

Lists information concerning standard tests which publishers should furnish; method by which test items selected, correlations between test results and other criteria, reliability coefficients, examiner's manual and scoring key, cost, and time required.

Whitney, F. L. ''The Evaluation of Educational Research,'' *School and Society*, XXXI (March 1, 1930), 289-90.

A list of points of criticism for analysis of master's and doctor's dissertations, formulated on the basis of judgments of sixty-one leaders in educational research in forty-two institutions of higher learning, state depart-

ments of education, and national offices.

Woellner, R. C., and Lyman, R. L. "Evaluating Books on Vocational Guidance," *School Review*, XXXVIII (March, 1930), 191-99.
Reproduces score card used and gives results secured for twenty-six books from 103 teachers.

Woodbridge, F. J. E. "Contrasts in Education, I: Education and Evolution," *Teachers College Record*, XXXI (October, 1929), 1-16.

Woodbridge, F. J. E. "Contrasts in Education, II: Education and Philosophy," *Teachers College Record*, XXXI (November, 1929), 121-36.

Woodbridge, F. J. E. "Contrasts in Education, III: Education and History," *Teachers College Record*, XXXI (January, 1930), 339-56.

"Free Sample Copies of Textbooks," *School Review*, XXXVII (October, 1929), 567-68.
Scores the practice of indiscriminate requests for free sample copies of textbooks.

"Invention and Appraisal," *Educational Method*, IX (December, 1929), 129-30.
States that there are two types of workers in education just at present: innovators who establish "Experimental schools" where traditional subjects are abolished and centers of interest set up, and scientists who search for facts on which to base curriculum materials and new procedures in dealing with the learner.

"The National Society for the Study of Educational Sociology," *School Review*, XXXVII (October, 1929), 573-75.
Suggests that the criticisms of educational sociologists would be more welcome if some practical substitute were offered for the school conditions condemned.

"The New Hampshire Educational Survey," *Elementary School Journal*, XXX (September, 1929), 8-11.
Criticizes the subjective and superficial methods used by the committee on the New Hampshire educational survey as reported in a pamphlet of sixteen pages.

"The New York City School Survey," *Elementary School Journal*, XXX (December, 1929), 245-48.
Quotes criticisms of the New York Board which delayed distribution of the report of the survey made in 1924 for five years.

"Policies as to Reviews in Educational Journals," *Educational Method*, IX (April, 1930), 437-38.
Nine recommendations of a committee of the Educational Press Association.

"Why a Book List and Reviews?" *School Science and Mathematics*, XXIX (October, 1929), 691-92.

XI. TRAINING RESEARCH WORKERS AND GUIDANCE OF GRADUATE STUDENTS

Adams, John. "Professors and Books," *School and Society*, XXXI (March 15, 1930), 347-51.
A discussion of whether college professors should write professional books and textbooks.

Almack, J. C. *Research and Thesis Writing*. (Boston: Houghton Mifflin Co., 1930), xviii + 310 pp.

Barr, A. S. "A Background for Research," *Journal of Educational Research*, XXI (February, 1930), 138-40.
Lists certain scientists who have contributed to the techniques of experimental research and lists both foreign and American sources of information on educational research.

Barr, A. S. "Research for Teachers," *Journal of Educational Research*, XX (June, 1929), 42-43.

Urges that since problem solving is considered a desirable form of pupil activity it may be employed effectively by supervisors in encouraging teachers to conduct investigations and improve teaching.

Betts, G. H. "Language Requirements for Doctors of Philosophy," *School and Society*, XXXI (March 8, 1930), 343-46.

An analysis based on a questionnaire investigation of 2,325 Doctors of Philosophy, of whom 71 percent are teaching.

Betts, G. H., and Kent, R. A. *Foreign Language Equipment of 2,325 Doctors of Philosophy*. Northwestern University Contributions to Education, No. 2. (Bloomington, Illinois: Public School Publishing Co., 1929), 152 pp.

Buckner, C. A. "An Overview for a Research," *University of Pittsburgh School of Education Journal*, V (March, 1930), 71-76.

An outline of specific suggestions to be used in preparing a graduate thesis.

Charters, W. W. "Editorial Comment," *Educational Research Bulletin* (Ohio State University), IX (February 5, 1930), 79.

Comments on the teaching experience, training, and vocational expectations of candidates at Ohio State University.

Cushing, Harvey. "The Binding Influence of a Library on a Subdividing Profession," *Science* LXX (November 22, 1929), 485-91.

A discussion of the medical library.

Chase, E. P. "Research or Administration," *Journal of Higher Education*, I (April, 1930), 216-19.

Shows that research as a field of work offers greater satisfactions and rewards than teaching or administration.

Cross, W. L. "The Improvement of College Teaching," *Association of American Colleges Bulletin*, XVI (March, 1930), 84-94.

Discusses at length the training of college teachers, that is, graduate requirements.

Dale, Edgar. "The Training of Ph.D's," *Journal of Higher Education*, I (April, 1930), 198-202.

Shows that most Doctors of Philosophy enter college teaching and urges adequate preparation for this work.

Doyle, H. G. "Doctors' Degrees in Modern Foreign Languages, (1928-29)," *Modern Language Journal*, XIV (October, 1929), 37-39.

Classified by institutions.

Edwards, I. N. "Educational Leadership," *Phi Delta Kappan*, XII (April, 1930), 187-88.

States that a leader should have a sense of value, know his facts, possess courage, have force of personality, and be somewhat of a partisan.

Engelhardt, Fred, and Otto, H. J. *Masters' and Doctors' Theses in Education, 1912-1928*. (Minneapolis, Minnesota: University of Minnesota, 1929), 32 pp.

Hamor, W. A., and Bass, L. W. "Is There an Age Dead-Line in the Scientific and Engineering Professions?" *Science*, LXX (November 1, 1929), 426-28.

Lists the ages of applicants for positions at the Mellon Institute of Industrial Research.

Hutchins, R. M. "The Spirit of the University of Chicago," *Journal of Higher Education*, I (January, 1930), 5-12.

Emphasizes the characteristics of the University of Chicago, including pro-

ductive scholarship and the experimental attitude.

Kelly, Robert L., and Anderson, Ruth E. "Great Teachers and Some Methods of Producing Them," *Journal of Educational Research*, XX (June, 1929), 22-30.
Based on inquiries sent to 349 representative college and university executive officers.

Laing, G. J. "The Doctor of Philosophy and College Teaching," *Association of American Colleges Bulletin*, XVI (March, 1930), 95-113.
Points out the rare combination of qualities which make for most successful college teaching.

Loehwing, W. F. "The Individual Plan of Graduate Study at the University of Iowa," *School and Society*, XXX (November 30, 1929), 743-45.
A plan, formulated by Seashore, which gives the student considerable freedom with respect to daily attendance of classes, course examinations, and accumulation of credits.

Manwaring, W. H. "Our Contemporary Research 'Aces'", *Science*, LXXI (April 4, 1930), 361-62.
Comments on the contribution of the large number of unexploited contemporary medical scientists as compared with the spectacular performances of so-called geniuses.

Merrill, W. A. "The Ph. D. Fetish," *School and Society*, XXX (December 14, 1929), 813.
Suggests that those who criticize the Doctor's degree as a qualification for teaching fail to consider that this is not the only qualification involved in making an appointment; a majority of desirable positions are filled from the ranks of Ph. D's although not all the holders of such a degree receive appointments.

Pearse, A. S. "Productive Scholarship," *School and Society*, XXXI (April 12, 1930), 493-96.
Lists thirteen reasons for the backwardness of scholars in doing the "big things" of the world.

Poffenberger, A. T. "The Development of Men of Science," *Journal of Social Psychology*, I (February, 1930), 31-47.
Based on data included in *American Men of Science:* birthplace, undergraduate college, graduate school, shifts of occupation, age at which degrees conferred, age at which name appeared in the directory, present position, etc.

Rice, S. A. "Notes on an Educational Policy for Student Research," *Social Forces*, VIII (March, 1930), 368-69.
Applies especially in the field of sociology.

Ruediger, W. C. "English and the Ph. D." *School and Society*, XXX (November 30, 1929), 742-43.
Suggests that the science type of research is not entirely appropriate for English and that themes for poems, dramas, novels, short stories, and essays may serve the same purpose in English as the so-called scientific thesis in certain other fields of learning.

St. John, J. L. "A Use of Journals by Research Men," *Science*, LXX (September 27, 1929), 309.
Describes a scheme for distribution of journals by the library to the desks of interested members of the staff.

Sangren, P. V. "The Participation of the Classroom Teacher in Educational Research," *Educational Administration and Supervision*, XV (November, 1929), 593-601.
Discusses the place of research in education, values of teacher participation in research, and practicability of and overcoming difficulties of teacher participation in research.

Seashore, C. E. "A New Plan of Registration," *Journal of Higher Education*, I (January, 1930), 36-37.
Describes the scheme of graduate study at the University of Iowa which emphasizes specialization, the acquisition of technical skills, independent scholarship, and the development of a balanced scholarly personality.

Skau, O. K. "The Ph. D. Fetish," *School and Society*, XXXI (March 29, 1930), 432.
Comments on the overemphasis even in India of formal qualifications in terms of academic degrees to the neglect of additional practical qualifications for teaching.

Smith, F. M. "The Ph. D. and the Research Fetish," *School and Society*, XXX (October 26, 1929), 559-62.
Discusses the pettiness of many research studies and theses in the field of literature.

Snedden, David. "The Hurtful Influences of Scholars on Useful Educations," *School and Society*, XXXI (February 1, 1930), 133-38.
Emphasizes the dangers of too much specialization at all levels of instruction.

Upham, A. H. "Educating College Teachers," *Association of American Colleges Bulletin*, XVI (March, 1930), 75-83.
Describes a number of plans for the improvement of college teaching; makes some comments on the relation between good teaching and research.

West, C. J., and Hull, Callie. "Doctorates in Chemistry Conferred by American Universities 1928-1929," *Journal of Chemical Education*, VI (December, 1929), 2209-23.
Lists institution, candidate, and thesis subject.

Wykoff, G. S. "How We Live and Teach At Novelty College," *English Journal*, College Edition, XVIII (December, 1929), 818-23.
Describes an ideal plan of college organization, selection and training of teachers, and procedure.

Young, C. E. "Language Requirement for the Doctorate of Philosophy," *School and Society*, XXXI (April 12, 1930), 509-10.
Comments on the study by Betts and Kent.

"Admission Requirements for the Harvard Graduate School of Arts and Sciences," *School and Society*, XXXI (March 15, 1930), 360-61.
Student must show ability to do graduate work as evidenced by graduation in the upper third of the class, Phi Beta Kappa membership, graduation with distinction, or distinguished work in a special field.

"The Consumer's Demand," *Journal of Higher Education*, I (February, 1930), 114-15.
States that the colleges which employ the product of the graduate school are insisting on good teachers rather than a product with major emphasis on research.

"The Department of Education of Yale University," *School and Society*, XXXI (March 15, 1930), 361-62.
A group limited to fifty gradute students is to be freed from conventional courses and routine requirements to work on the seminar plan.

"Education as a Profession," *Phi Delta Kappan*, XII (October, 1929), 65-68.
A symposium by members of Phi Delta Kappa.

Iowa University, Graduate College. *Graduate Theses Including Schedule of Dissertations of Approved Candidates for Advanced Degrees with Major and Minor Subjects, January 15, 1929.*

Iowa Studies, First Series, No. 158, Series on Aims and Progress of Research. (Iowa City, Iowa: University of Iowa, 1929), 46 pp.

"Phi Delta Kappa Research Fellowship and Scholarship," *Elementary School Journal*, XXX (March, 1930), 488-90.
Announces a $2500 fellowship and a $500 scholarship for 1930-31.

"Positions Open in Various Colleges and Universities to Graduate Students Majoring in Chemistry," *Journal of Chemical Education*, VII (February, 1930), 389-97.
Lists by institutions the available scholarships, fellowships, and assistantships.

"President Butler on Modern Foreign Languages," *School Review*, XXXVIII (February, 1930), 84-86.
Comments on the value of foreign languages and the attitude of graduate students toward foreign languages as a requirement for the Doctor's degree.

"The Producer's Reply," *Journal of Higher Education*, I (February, 1930), 115.
States the attitude of the graduate school with respect to the training of college teachers.

"Professional Topics: Research, Service, Leadership, and Education as a Profession," *Phi Delta Kappan*, XII (August, 1929), 33-47, 55-58.
A symposium by a number of educational workers.

"Research of Post Doctorate Students at Yale University," *School and Society*, XXX (November 30, 1929), 747-49.
A list of thirty-six students and their projects.

"Schools as Centers for the Scientific Study of Education," *Elementary School Journal*, XXX (October, 1929), 84-85.
Describes a type of activity in the intermediate grades in Baltimore in which each supervisor invited three or four teachers to participate in experimental work.

"Who Teaches Psychology?" *Journal of Higher Education*, I (February, 1930), 98-99.
Points out that membership in professional and scholarly organizations is not in keeping with the large number of teachers in the given fields, especially in psychology, history, and modern languages.

XII. PROGRESS IN EDUCATIONAL RESEARCH AND CONTRIBUTIONS OF PROFESSIONAL GROUPS

Angell, J. R. "The Yale Institute of Human Relations," *Educational Record*, XI (January, 1930), 3-11.
The object of the Institute is to provide a research and teaching center for those university divisions directly concerned with the problems of man's individual and group conduct; to promote understanding of human life from the biological, psychological, and sociological viewpoints.

Blackstone, E. G. *Research Studies in Commercial Education*, IV. University of Iowa Monographs in Education, First Series, No. 11. (Iowa City, Iowa: University of Iowa, 1929), 240 pp.

Coleman, Algernon. "A Modern-Language Survey," *Journal of Higher Education*, 1 (January, 1930), 17-22.
Summarizes the results of the Modern Foreign-Language Study.

Cooper, W. J. "Some Responsibilities of the United States Bureau of Education," *Educational Record*, X (July, 1929), 184-90.

Haggerty, M. E. "The Improvement of College Education," *Sixteenth Annual Conference on Educational Measurements, Indiana University*, Bulletin of the School of Education, Indiana Uni-

versity, Vol. V, No. 6. (Bloomington, Indiana: Bureau of Coöperative Research, Indiana University, 1929), pp. 84-96.
Outlines extent of the literature in the field, new ventures in college education, institutions making investigations of college education, techniques of research, and the studies pursued at the University of Minnesota.

Hartshorne, Hugh, and May, Mark A. *Studies in the Organization of Character.* New York: Macmillan Co., 1930.

Jessen, C. A. *Secondary Education.* Bureau of Education Bulletin No. 22, (Washington: Bureau of Education, 1929), 20 pp.
Discusses in part research in secondary education.

Knight, F. B., and Others. *Report of the Society's Committee on Arithmetic.* Twenty-ninth Yearbook of the National Society for the Study of Education. (Bloomington, Illinois: Public School Publishing Co., 1930), vii + 710 pp.
Deals with some aspects of modern thought in arithmetic and with research in arithmetic (the techniques of research and a survey of previous research).

Lentz, T. F. "Character Research and Human Happiness," *Religious Education,* XXV (February, 1930), 134-39.

Malott, J. O. "Commercial Education, 1926-1928." *Bureau of Education Bulletin,* No. 26, (Washington: Bureau of Education 1929), 28 pp.
Reviews significant literature in the field.

Mann, C. R. "International Intellectual Coöperation," *Educational Record,* X (October, 1929), 249-58.
Describes the activities of a permanent advisory Committee on Intellectual Coöperation appointed by the League of Nations in 1922.

Morton, R. L. "Coördinated Program of Research," *Educational Research Bulletin* (Ohio State University), IX (January 22, 1930), 29-38.
Describes the articulation of research agencies in Ohio.

Morton, R. L. "The Work of the Educational Council and of the Director of Research for 1929," *Ohio Schools,* VIII (January, 1930), 6-7, 28-29.
Describes the program of work in Ohio.

Ogburn, W. F. "Three Obstacles to the Development of a Scientific Sociology," *Social Forces,* VIII (March, 1930), 347-50.
Mentions as obstacles: intellectualism, the idea that the aim of science is mastery or control, and pressure for action and results.

Osburn, W. J. "State-wide Research," *Educational Research Bulletin* (Ohio State University), IX (April 2, 1930), 189-94.
Describes the work of the Division of Research of the Ohio State Department of Education.

Reed, E. T. "Teachers College and Spirit of Research," *School Executives Magazine,* XLIX (November, 1929), 152-54.
Discusses research in Oregon institutions as an answer to Judd's criticism of teachers colleges.

Rogers, J. E. "Research High Spots in Physical Education," *American Physical Education Review,* XXXIII (September, 1928), 443-46.

Russell, W. F. "The Character Education Inquiry," *Educational Record,* X (July, 1929), 202-8.

Ryan, W. C. "The Elsinore World Conference on the New Education," *School and Society,* XXX (September 28, 1929), 438-46.
A report on the conference.

Ryan, W. C. "The Geneva Conference of the World Federation of Education Associations," *School and Society,*

XXX (September 7, 1929), 325-31.

Woody, Clifford, and Others. *Quantitative Measurement in Institutions of Higher Learning.* Yearbook Number XVIII of the National Society of College Teachers of Education. (Chicago: University of Chicago Press, 1930), x + 254 pp.

A summary of investigations in the field and a bibliography of 664 items.

"Educational Research in England," *School and Society,* XXXI (February 22, 1930), 251-52.

Discusses the desirability of establishing an educational research bureau by the National Union.

"The Federal Advisory Committee on Education," *School Review,* XXXVII (September, 1929), 481-86.

Outlines the personnel and tentative or projected activities of the committee.

"Growth of Education Associations," *Journal of the National Education Association,* XIX (March, 1930), 98.

Statistics on membership in the National Education Association and state associations, by states.

"The Journal's Annual Roll Call," *Journal of the National Education Association,* XIX (January, 1930), 21-27.

Lists the significant educational developments of the year in the various states and territories.

"The Office of Education," *School Review,* XXXVII (December, 1929), 722-24.

A statement of the reorganization of the Bureau of Education as the Office of Education.

"Research in Curriculum Construction," *Religious Education,* XXIV (April, 1929), 346-58.

A symposium.

"Research News and Communications," *Journal of Educational Research,* XXI (March, 1930), 237-38.

Reviews the work of the National Committee on Research in Secondary Education over a period of four years and a half.

"The Social Science Research Council," *School and Society,* XXX (October 26, 1929), 566-67.

The Superintendent Surveys Supervision. Eighth Yearbook of the Department of Superintendence. Washington: Department of Superintendence, 1930. Chapter VII.

Chapter VII suggests experimental studies which should be made in measuring supervision.

Vitalizing the High-School Curriculum. Research Bulletin of the National Education Association, Vol. VII (September, 1929). Washington: National Education Association. pp. 173-276.

Reviews important curriculum studies in research.

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RESEARCH NEWS and COMMUNICATIONS

Address all research news and communications to Editor Carter V. Good, Teachers College, University of Cincinnati, Cincinnati, Ohio.

Periodical Review of the Scientific Literature in Education.—It has been felt by many that it would be desirable to have all the scientific publications in education reviewed in a single periodical. Such a periodical is now being launched by the American Educational Research Association, a Department of the National Education Association. This is the new name for the American Educational Research Association, which has become affiliated with the National Education Association as a department. The affiliation gives the Association the advantage of co-operation in the support of its new publication.

The new periodical will probably be entitled, *A Review of Educational Research*. It will be devoted exclusively to the review of scientific literature in education. The entire field of education will be covered in about fifteen issues, each one devoted to a particular topic. Representative topics are: the curriculum, special methods of teaching in the elementary school, school organization, and individual differences and their measurement. Five issues will be published each year so that the entire list of topics will be covered in a cycle of three years. Each issue will therefore review the literature on a given topic over a three-year period. The reviews are to be written in compact and readable form and are to be accompanied by a bibliography. They will be somewhat similar to the successful summary of the scientific literature in reading by Gray and in arithmetic by Buswell and Judd. The purpose is to make the summaries useful to school administrators and teachers as well as to students and scientific workers in education.

The plan is to issue the first number not later than February 1, 1931. Regular members of the department will receive the publication. Others who wish to subscribe for the periodical may do so by taking an associate membership at a fee of $4.00 a year. There are no restrictions on associate membership. Applications for associate membership should be addressed to the secretary of the American Educational Research Association, Dr. W. S. Gray, School of Education, University of Chicago. The chairman of the editorial board of the new journal is Dr. F. N. Freeman of the University of Chicago.

A 1931 Yearbook on Requirements for Higher Degrees in Education.—During the past few years there has been much discussion of the requirements for higher degrees in education. A number of proposals looking toward more or less radical changes in the conventional content of courses or dissertation requirements have been made. Several institutions have experimented with new requirements.

At the meeting of the National Society of College Teachers of Education in February, 1930, several papers were presented reviewing some of the practices now in operation and expressing opinions concerning the best practice. Following

this meeting the Executive Committee decided to gather together accounts of the detailed practices followed in the universities which grant the larger number of higher degrees and to publish them in a yearbook to be presented at the 1931 meeting.

This yearbook is now in course of preparation. It will consist of a series of statements drawn up by the various institutions. Each statement will be quite explicit, and will indicate the actual procedure which is followed in training students and granting degrees, the requirements which are laid down, and the reason underlying the practices followed. These detailed statements will probably be preceded by an historical introduction to modern graduate study in education and by a summary of the practices revealed in the individual articles.

It is expected that the yearbook will be ready by February 1, 1931. It will be distributed by the secretary of the Society, Dr. S. A. Courtis, University of Michigan. The editor of the yearbook is Dr. F. N. Freeman of the University of Chicago.

A 1931 Yearbook on Supervision.—Four projected yearbooks of the Department of Supervisors and Directors of Instruction were mentioned in the September issue of this department. Additional information concerning the content of the 1931 yearbook, "The Evaluation of Supervision," has been provided by Dr. Clifford Woody of the University of Michigan, chairman of the yearbook committee.

In connection with the preparation of the yearbook, circular letters were addressed to all members of the Department of Supervisors and Directors of Instruction making inquiry concerning research projects of the past year undertaken for the purpose of evaluating the effects of supervision. Circular letters also were sent to deans of schools of education to gather information concerning Doctors' and Masters' theses dealing with this problem.

The chapters of the yearbook deal with the following topics: statement of the problem, plan of procedure of the committee, criteria, types of evidence and their treatment, supervision versus non-supervision, relative value of variations of supervisory activities, appraisal of supervisory activities through case studies, evaluation of supervisors, needed studies for more complete evaluation, summary and conclusions, and bibliography.

A 1931 Yearbook on Rural Education.—The part of the forthcoming yearbook of the National Society for the Study of Education which deals with rural education is being prepared by a committee of which Dr. O. G. Brim of Ohio State University is chairman. The topics treated and the workers responsible are as follows:

A. Social and economic status of rural life, G. A. Works.
B. Problems relating to the public-school program.
   1. Pupil status, George Kyte.
   2. Availability of schools, Katherine Cook.
   3. Curriculum and instructional equipment.
      Elementary education, Fannie Dunn.
      Secondary education, E. N. Ferriss.
   4. Teaching staff, Mabel Carney.
   5. Supervision, Norman Frost.
   6. Administration, Julian Butterworth.
   7. Finance, H. C. Morrison.
C. Problems relating to other educational agencies.
   1. Coöperative extension work in agriculture and home economics, T. H. Eaton.
   2. Other agencies for adult education, J. D. Willard.
D. Principles of rural education, O. G. Brim.

The purpose of the last section dealing with principles of rural education is to examine critically the various points of view held by leaders in the field.

The part of the yearbook concerned with the textbook was described in the September issue of this department.

1931 Yearbooks of Departments of the National Education Association.—The Department of Superintendence will issue in February, 1931, the second report of its Commission on the Articulation of the Units of American Education. The first yearbook of this Commission appeared in 1929. The Commission consists of:

H. S. Weet, Chairman, Superintendent of Schools, Rochester, New York.
C. R. Reed, Vice Chairman, Superintendent of Schools, Minneapolis, Minnesota.
C. H. Judd, Director, School of Education, University of Chicago, Chicago, Illinois.
F. J. Kelly, Lecturer in Higher Education, University of Chicago, Chicago, Illinois.
J. H. Newlon, Director of Lincoln School, Teachers College, Columbia University, New York City.
R. E. Tidwell, State Department of Education, Montgomery, Alabama.
J. W. Withers, Dean, School of Education, New York University, New York City.

The title of the next yearbook of the Department of Elementary School Principals is "The Principal and Supervision." The editorial committee includes: Isabel Tucker, Chairman, Shenandoah School, St. Louis, Missouri; Aaron Kline, Pullman Public School, Chicago, Illinois; and E. R. Laing, Burt School, Detroit, Michigan.

The forthcoming yearbook of the Department of Classroom Teachers will deal with the general theme of "Teacher Welfare through Teachers Organizations." The editor is Agnes Winn, Director of Classroom Service for the Association.

The next yearbook of the Department of Supervisors and Directors of Instruction has already been described in this department.

The Departments of Secondary School Principals, Deans of Women, and Teachers Colleges also publish what are called yearbooks, although in reality they consist only of the proceedings of their annual meetings.

Department of Superintendence Fund for Educational Research.—The department has issued a bulletin describing its plan for the establishment of a fund of one million dollars to finance educational research. Methods of participation in the establishment of this fund include bequest insurance, contributions in cash, legacies specified in wills by friends of education, and life memberships in the department. The department's Committee on Financing Educational Research consists of: R. J. Condon, Chairman, Friendship, Maine; F. W. Ballou, Superintendent of Schools, Washington, D. C.; L. F. Hodge, Superintendent of Schools, Yonkers, New York; and C. H. Judd, Director, School of Education, University of Chicago, Chicago, Illinois.

Problems in Teacher Training: Volume V.—The major topic of the Fifth Annual Conference of the Eastern States Association of Professional Schools for Teachers was "The Professionalization of the Public-School Teaching Staff" and dealt chiefly with the problem of in-service training. The proceedings appeared in September as Volume V, *Problems in Teacher Training*, edited by Dr. A. L. Suhrie of New York University, and available at the New York University Press Bookstore.

Bibliography on Higher Education.—By means of an appropriation from the Ohio College Association, Dr. Herbert A.

Toops and T. Ernest Newland of the Department of Psychology, Ohio State University, have been able to collect from 12,000 to 13,000 titles pertinent in some way to the general field of college and university problems. Certain of the references bear dates as early as the first half of the 19th century, although most of them fall between 1890-1930. Magazine articles have been checked through May, 1930. All known sources have been thoroughly covered for material. The references have been listed alphabetically by author, association, or institution and will be cross-referenced with respect to the particular phases of the college or university field to which they pertain. It seems not unreasonable to assume that this collection is the most comprehensive to date made available on the subject.

This bibliography should have several distinct values: (1) the provision of an abundance of source material for administrators, teachers, and students who may be interested in an historical approach to the various problems of higher education; (2) a source through which may be ascertained the extent to which various persons, educational centers, and other organizations have given concrete evidence through publication of their interest in higher education; and (3) of great reference value to libraries and research organizations. Publication arrangements have not yet been completed.

Research and College Entrance.—Bulletin No. 61 of the Ohio College Association devotes approximately fifty-five pages to a statement of two hundred research problems relating to college entrance. The bulletin represents the formulation of a five-year research program, and is the result of a conference in June, 1929, held at Ohio State University by the Ohio College Association Committee on Intelligence Tests for College Entrance and by its two subcommittees, the Committee on Scholastic Records and the Committee on Diagnostic Tests and Remedial Education. The bulletin was edited and made available in mimeographed form by Dr. Herbert A. Toops of Ohio State University.

Research of the Ohio Education Association.—A mimeographed bulletin of twenty-five pages lists the research activities for the year, 1929-30, of members of the Educational Research Department of the Ohio Education Association. Classification is made on the basis of studies completed, studies under way, and publications. In addition a subject classification of investigations in progress is provided. The editorial work was done by Miss Josephine MacLatchy of Ohio State University.

Phi Delta Kappa Fellowship Award.—The largest fellowship in Education in existence, in the United States or foreign countries, has been made by the Phi Delta Kappa Education Fraternity to W. W. Hale, graduate student at Stanford University. The award is $2500 which is to promote the research work of a candidate for the Ph.D. degree; the study is to be completed by the end of the academic year, 1930-31. The scholarship award of $500 was not made for the year, 1930-31, in view of the fact that requirements were not fully met by any of the applicants. Phi Delta Kappa, an organization devoted to research, service, and leadership in the field of public education, is the oldest professional fraternity among school men.

New Publications of the American Physical Education Association.—Since January 1, 1930, the Association has undertaken the publication of two official periodicals. The *Journal of Health and*

Physical Education is intended for the rank and file of the teaching body who, in addition to a certain amount of theoretical and philosophical material, need practical information for use in enlivening their classroom work. In brief, this journal aims to present a balanced treatment of theoretical, inspirational, and practical materials.

The *Research Quarterly* is more specialized in nature and makes its appeal to a very definite professional group interested in the more abstract, technical, and scientific material in the field of physical and health education. This periodical will publish studies of a scientific character, bibliographies, abstracts of current literature, and book reviews. The editor in charge of these publications is E. D. Mitchell of the University of Michigan.

National Association of Commercial Teacher-Training Institutions.—The Association is organized to accomplish a four-fold purpose: the improvement of curriculums for the training of commercial teachers; the elevation of standards for the certification of commercial teachers; promotion of research in commercial education; and the promotion of appropriate recognition of commercial education among school workers. The annual meetings of the Association consider some aspect of one of the four objectives enumerated. The 1929-30 meeting was concerned with principles of curriculum building for commercial teacher-training institutions. The Association closed its fiscal year on July 1, 1930, with twenty-nine institutional members and sixty-one associate members. Detailed information concerning membership in the Association and its work may be secured from the Secretary, Helen Reynolds, Ohio University, Athens, Ohio.

Two-Year Study of Higher Education.—The American Association of University Women, under the leadership of its Executive and Educational Secretary, Kathryn McHale, has initiated a two-year study of current changes and experiments in higher education, to be climaxed by an institute on higher education in connection with the Biennial Convention of the Association in Boston, April 8-11, 1931. The Educational Policies Committee of the Association together with an Advisory Committee and Regional Committees are at work on the study. Headquarters of the Association are at 1634 Eye Street, Washington, D. C.

There is already enough interest and assurance of support to guarantee the publication of the final report in probably not less than three significant volumes. The pooling of experimental experiences among the institutions of higher education coöperating is well under way. The following topics are suggestive of the scope of changes and experiments which institutions have deemed worthy to report:

I. Care and Direction of Students: (1) Admission system, selection of students, method; limited enrollment; measurement of student intellect; prediction of student scholarship. (2) Educational, personal, and vocational guidance—(a) Direction of intellectual life of students: encouragement of student scholarship, initiative, self-expression, creative work, independent reasoning, self-dependence. (b) Direction of non-curricular education: tastes, manners, morals, ideals. (c) Advising based upon subjective and objective data: general diagnosis; special diagnosis of individual students; psychological, scholastic aptitude, and placement tests; mental hygiene, special academic disabilities, non-intellectual traits. (d) Re-education.

II. Curriculum and Instruction: (1) Units or courses required of all students

without option; (2) Units or courses required with option; (3) Courses required in the Freshman year; (4) Other courses open to Freshmen; (5) Courses required for major; (6) Number of one-hour courses; (7) Number of two-hour courses; (8) Examinations to test reading knowledge of foreign language; (9) Comprehensive examinations—for honors only, for all candidates for a degree, in major field only, in other fields; (10) Honors courses; (11) Tutorial work; (12) Faculty direction of work in honors; (13) Improvements in examinations; (14) Improvement in marking system; (15) Improvements in curricula inclusions; (16) Improvement of college instruction; (17) Departments or courses not in other institutions in the region; (18) Class size and efficiency of instruction; (19) Library as an educational agency; (20) Survey and orientation courses; (21) Attempts to determine what are undergraduate versus graduate courses; (22) Non-credit courses—sonant properties of speech, physical education, etc.; (23) Fine arts.

III. Organization and Administration: (1) Articulation of secondary school, junior college, and senior college. (2) Selection, improvement, promotion, and salaries of college faculty; (3) Alumni education; (4) College support—endowment and other phases; (5) Making and administering the budget; (6) Faculty sabbatical; (7) The tuition system; (8) Cost of instruction; (9) Scholarship system; (10) Community life; (11) Academic freedom; (12) Research provisions; (13) Administrative machinery; (14) Chapel; (15) Definition of purpose; (16) Fraternities and Sororities; (17) Student participation in government; (18) Absences and cut system.

Junior-College Research in California.—A bibliography of 1600 titles on the junior college compiled by Dr. W. C. Eells of Stanford University, has been issued as Bulletin No. 2, 1930, by the Office of Education at Washington.

A mental-educational survey of forty-seven California junior colleges, including more than eleven thousand students, has been conducted by W. C. Eells and published as Bulletin No. J-3, 1930, of the California State Department of Education at Sacramento.

Research Notes from Harvard.—The next Inglis Lecture is to be given by John Dewey while he is serving as Lecturer in Philosophy at Harvard on the William James Foundation. Previous Inglis Lectures have been given by Koos, Hanus, Flexner, Judd, Counts, and Briggs.

A subsidy from the General Education Board assures the completion of W. F. Dearborn's twelve-year program in the measurement of individual growth in all its aspects. This study has been in progress over a period of seven years.

A grant from the Milton Fund of Harvard University has enabled Bancroft Beatley to make an experimental study of the relative efficiency of the 8-4 and the 6-3-3 plans of school organization.

No applications for admission under the old one-year plan of study for the degree of Master of Education at Harvard will be received in the future, and all programs for this degree must be completed by the end of the summer of 1934. The new two-year program for the Ed.M. with a general examination and apprenticeship is now established as the only standard scheme of professional training in Education at Harvard. Certain changes in Doctorate procedure are under consideration and will be described in detail in the forthcoming yearbook of the National Society of College Teachers of Education.